L 13762-65 EWP(e)/EWT(n)/EPF(n)-2/EPR/EWP(b) Ps-4/Pu-4 ASD(d)/ASD(m)-3 JD/
ACCESSION NR: AP4045190 JG/AT/WH S/0080/64/037/009/1872/1878

AUTHOR: Samsonov, G. V.; Obolonchik, V. A.; Paderno, Yu. B.; Serbina, R. V.; Fomenko, V. S.; Ogorodnikov, V. V.

TITLE: Synthesis and some physical and chemical properties of the binary lanthanum-sodium boride

SOURCE: Zhurnal prikladnoy khimii, v. 37, no. 9, 1964, 1872-1878

TOPIC TAGS: boride, lanthanum boride, lanthanum sodium boride, lanthanum sodium boride synthesis, boride synthesis, lanthanum sodium boride property

ABSTRACT: The binary lanthanum-sodium boride was obtained by electrolysis of a fused salt electrolyte consisting of 160 g borax, 30 g sodium fluoride, and 15 g lanthanum oxide. The electrolysis was performed at 900—950C with a current density of 0.5 amp/cm^2. The cathode deposits obtained under the above conditions contained 55.6% lanthanum, 6.8% sodium, 36.8% boron, 0.4% free carbon, and no free boron. The composition could be varied by changing the amount of

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L 13762-65
ACCESSION NR: AP4045190

borax in the electrolyte. X-ray diffraction patterns of three binary borides of different compositions contained only the lanthanum hexaboride lines. The increase of the lattice constant with increasing sodium content indicates that sodium atoms first replace lanthanum atoms in the lanthanum hexaboride lattice and then gradually replace octahedral boron complexes. Hot compacted binary boride has a uniform structure consisting of square-shaped crystals with a microhardness of 2200—2300 kg/mm^2. At a porosity of 2%, the hot-compacted boride has a resistivity of 113.4 μohm·cm at room temperature, which increases linearly to 275 μohm·cm at 900C. The work function also increases linearly from 2.6 ev at 1000C to 4.05 ev at 1770C. The work function has a tendency to increase with the time. The emission current of binary boride is two orders lower than that of lanthanum hexaboride. Orig. art. has: 7 figures and 6 tables.

ASSOCIATION: none

SUBMITTED: 07Jan63 ATD PRESS: 3131 ENCL: 00

SUB CODE: IC, GC NO REF SOV: 005 OTHER: 005

Card 2/2

SAMSONOV, G.V.; PASECHNIK, V.A. (Leningrad)

Thermodynamic potential enthalpy and entropy of swelling in ion exchange. H^+ Ca^{++} exchange of SBS sulfonated resins. Zhur. fiz. khim. 38 no.4:858-862 Ap '64. (MIRA 17:6)

1. Institut vysokomolekulyarnykh soyedineniy AN SSSR.

L 21129-65 EPF(c)/EPF(n)-2/EPR/EWP(j)/EWT(m)/EWP(b)/T/EWP(c)/EWP(t)
Pc-4/Pr-4/Ps-4/Pu-4 IJP(c)/AEDC(a) AT/RM/WH/JW/JD/JG

ACCESSION NR: AP5002581 S/0076/64/038/012/2974/2975

AUTHOR: Gordiyenko, S. P.; Samsonov, G. V.; Fesenko, V. V.

TITLE: Composition of the vapor over gallium nitride

SOURCE: Zhurnal fizicheskoy khimii, v. 38, no. 12, 1964, 2974-2975

TOPIC TAGS: gallium nitride, semiconductor nitride, thermal dissociation, gallium nitride vapor, vapor composition, electronic structure

ABSTRACT: The vaporized products of thermal dissociation of pure semiconductor gallium nitride, $GaN_{0,98}$ have been studied by mass spectrometry at 1000—1150K and ionization potentials at 18—80v. The composition of vapors of semiconductor nitrides was not studied previously, and the data from literature hinted at the existence of complex polymers in the gallium nitride vapors. The vaporization of gallium nitride was carried out in an open crucible. Ga^+, GaN^+, $Ga_2N_2^+$, $(Ga_3N_3)^{2+}$, and dissociation products of polymers were identified by the mass-spectra of vapors. Polymer content in the vapors increased with decreasing ionization potential. It was

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ACCESSION NR: AP5002581

concluded that gallium nitride vaporized mainly as dimer, which dissociated in the vapors at the source of ions. The dimerization was correlated with the electronic configuration of Ga and N atoms. An even greater tendency to dimerization was predicted for GaP and GaAs vapors because of the decrease in the energetic stability of their electronic configurations. The superconductivity of GaN at relatively high temperatures is also correlated with the stability of the electronic configuration of both atoms in the GaN molecule. Orig. art. has: 1 table.

ASSOCIATION: Institut problem materialovedeniya Akademii nauk UkrSSR (Institute for the Study of Materials, Academy of Sciences, UkrSSR)

SUBMITTED: 22Apr63 ENCL: 00 SUB CODE: GC, SS

NO REF SOV: 006 OTHER: 003 ATD PRESS: 3165

Card 2/2

MARCHENKO, V.I.; SAMSONOV, G.V.; FOMENKO, V.S.

Thermionic emission properties of praseodymium and neodymium sulfides. Zhur. tekh. fiz. 39 no.1:128-130 Ja '64. (MIRA 17:1)

1. Institut metallokeramiki i spetsial'nykh splavov AN UkrSSR, Kiyev.

SAMSONOV, G.V.; PONOMAREVA, R.B.; SHANDALOVA, L.P.

Change in the size of protein macromolecules after their tertiary structure is broken by the rupture of disulfide bonds. Dokl. AN SSSR 154 no.6:1448-1451 F '64. (MIRA 17:2)

1. Institut vysokomolekulyarnykh soyedineniy AN SSSR. Predstavleno akademikom V.A.Engel'gardtom.

ACCESSION NR: AP4035810 S/0020/64/156/001/0061/0063

AUTHOR: Lamikhov, L. K.; Samsonov, G. V.

TITLE: Inoculation of Aluminum with Transition Metals

SOURCE: AN SSSR. Doklady*, v. 156, no. 1, 1964, 61-63

TOPIC TAGS: inoculation, Al, transition metal, electron structure electron shell, La, Sc, Ni, Ti, Zr, grain refiner

ABSTRACT: In discussing certain shortcomings of the current theories on the suitability of transition metals for the inoculation of Al, the authors point out that there is no information as to the relationship between the electron structure of the inoculant and the inoculated metal although they assume such relationship to be of primary nature in determining all other factors. They contend that the modifying effect of transition metals is accounted for by the activity and the reactivity of transition metals expressed by such criteria as the degree of incompleteness of d-electron shells of their atoms. The authors employed standard methods for the investigation of "AVOO" type Al inoculated with 14 different transition metals. However, the effect of Sc and Re additions on the

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ACCESSION NR: AP4035810

size of Al macrograins has been observed for the first time. Sc proved a most effective inoculant but its inoculating effect diminishes as the d-level from Sc to Ni is being filled. The authors' data stand in good agreement with other findings and are applicable to Cu alloys for which Ti and Zr are effective grain refiners. The authors suggest that the inoculating ability of transition metals is determined by the number and energetic state of electrons on the incomplete shells of the isolated metal atoms, which should be a basis for the development of a rational theory of the inoculation of Al and Al alloys. Orig. art. has: 2 figures and 1 table.

ASSOCIATION: Khimiko-metallurgicheskiy institut Sibirskogo ordeleniya Akademii nauk SSSR (Institute of Chemistry and Metallurgy of the Siberian Division of the Academy of Sciences SSSR) Institut metallokeramiki i spetssplavov Akademii nauk USSR (Institute of Metal Ceramics and Special Alloys, Academy of Sciences USSR)

SUBMITTED: 25Mar63 DATE ACQ: 26May64 ENCL: 00

SUB CODE: GC, MM NO REF SOV: 009 OTHER: 004

Card 2/2

SINEL'NIKOVA, Vera Semenovna; PODERGIN, Veniamin Alekseyevich; TKACHIN, Viktor Nikolayevich; SAMSONOV, G.V., red.

[Aluminides] Aliuminidy. Kiev, Naukova dumka, 1965. 240 p. (MIRA 18:11)

1. Chlen-korrespondent AN Ukr.SSR (for Samsonov).

ACCESSION NR: AP4042211 S/0020/64/157/002/0408/0411

AUTHOR: L'vov, S. N.; Nemchenko, V. F.; Kosolapova, T. Ya.; Samsonov, G. V.

TITLE: Physical properties of titanium carbide in the homogeneity region

SOURCE: AN SSSR. Doklady*, v. 157, no. 2, 1964, 408-411

TOPIC TAGS: titanium carbide, carbon deficient titanium carbide, titanium carbide electrical property, titanium carbide electric conductivity, titanium carbide semiconducting property

ABSTRACT: An investigation has been made in the 20—1200C range of the time dependence of the specific resistivity and the coefficient of thermal emf of titanium carbide with a stoichiometric composition and also of carbon-deficient compositions, $TiC_{0.50}$ (87.3% Ti, 12.47% C_{fix}), $TiC_{0.72}$ (84.3% Ti, 15.3% C_{fix}), $TiC_{0.81}$ (82.4% Ti, 17.1% C_{fix}), and $TiC_{0.988}$ (79.8% Ti, 19.6% C_{fix}, 0.4% free C). The Hall coefficient and magnetic susceptibility have also been measured at room temperature. The specific resistivity at room temperature was found to decrease from 174 to 52.2 ohm·cm as the titanium carbide approached

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ACCESSION NR: AP4042211

the stoichiometric composition. The Hall coefficient increased from $-4.0 \cdot 10^4$ to $+6.7 \pm 0.2 \cdot 10^4$ $cm^3 \cdot coul$. The Hall coefficient and thermal emf, which varied from -7.7 ± 0.2 to $+12.5 \pm 0.2$ μv/degC, were both of the same sign and changed analogously with increasing carbon content. The magnetic susceptibility per unit mass, varying from $3.0 \pm 0.1 \cdot 10^{-6}$ to $3.22 \pm 0.36 \cdot 10^{-6}$, remained almost unchanged and practically equal to that of pure titanium, i.e., $3.2 \cdot 10^{-6}$. The charge carrier mobility increased quite sharply from 2.3 to 12.8 $cm^3/v \cdot sec$ as the titanium approached the stoichiometric composition. The negative values of the Hall coefficient and thermal emf indicate a predominantly electron conductivity in the entire homogeneity portion of the carbide studied. The relative contribution of electrons to electric conductivity increased on approaching the stoichiometric composition, with a particularly sharp increase in the region of 46—50 at%C. The increasing electric conductivity with increased carbon content observed can be explained by the higher mobility of conductivity electrons. The experimental data show the metallic nature of the electric conductivity of titanium carbide with stoichiometric and nonstoichiometric compositions in

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ACCESSION NR: AP4042211

the entire temperature range investigated. The data indicate no possibility of the appearance of semiconductor-type conductivity in the titanium carbide investigated. Orig. art. has: 4 figures and 1 table.

ASSOCIATION: Institut problem materialovedeniya Akademii nauk UkrSSR (Institute of Problems in the Science of Materials, Academy of Sciences, UkrSSR); Khersonskiy pedagogicheskiy institut imeni N. K. Krupskoy (Kherson Pedagogic Institute)

SUBMITTED: 06Mar64 ATD PRESS: 3073 ENCL: 00

SUB CODE: MM, EM NO REF SOV: 008 OTHER: 003

Card 3/3

EWT(m)-2/EPR/EWP(q)/EWP(b) Ps-4/Pu-4 IJP(c)/RAEM(t)

ACCESSION NR: AP4043542 S/0020/64/157/004/0834/0836

AUTHOR: Neshpor, V. S.; Samsonov, G. V. B

TITLE: The relationship between the factor of merit of the thermal emf of monocarbides and mononitrides of transition metals and their atomic characteristics 27 71

SOURCE: AN SSSR. Doklady*, v. 157, no. 4, 1964, 834-836

TOPIC TAGS: transition metal, transition metal carbide, transition metal nitride, carbide thermal electromotive force, nitride thermal electromotive force, electromotive force merit factor

ABSTRACT: The relationship between the factor of merit of the thermal emf (Z) and the atomic characteristics of the heat-resistant monocarbides and mononitrides of the transition metals of the III-VI groups of the periodic table has been studied. The majority of the compounds studied have a comparatively low Z (of the order of 10^{-7}—10^{-5} per degree). Vanadium monocarbide ($VC_{0.98}$) has the lowest value of Z($0.9 \cdot 10^{-6}$ per degree) which, it should be noted, is the only monocarbide to have a positive sign for the thermal emf at room temperature.

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L 8569-65
ACCESSION NR: AP4043542

An analysis of the literature and experimental data showed that in the investigated class of metal-like compounds, e.g., carbides or nitrides, the Z of the compound increases with the increasing capacity of the atoms of the metallic component to accept valence electrons, which is characterized by the 1:Nn ratio (N is the main quantum number of the partially filled d-shell of the metal atom, n is the number of electrons in the d-shell of a free atom). Hence, to increase the Z of the metal-like heat-resistant compounds of the type studied by alloying, an alloying component should be used which would promote the most complete passage of the valence electrons of the metalloid component to the entire electron group, with the latter distributed in the most symmetrical manner in the space between the crystal lattice sites occupied by the atoms of the metal and nonmetal. Orig. art. has: 1 figure and 1 table.

ASSOCIATION: Institut problem materialovedeniya Akademii Nauk SSSR (Institute of the Problems of the Science of Materials, AN SSSR)

SUBMITTED: 24Mar64 ATD PRESS: 3096 ENCL: 00

SUB CODE: MM NO REF SOV: 017 OTHER: 003

Card 2/2

Pab/Pu-4 JD/MW

AM5014981 BOOK EXPLOITATION UR/62 60 B+1

Samsonov, Grigoriy Valentinovich; Kislyy, Pavel Stepanovich

High-temperature non-metallic thermocouples and tips (Vysokotemperaturnyye nemetallicheskiye termopary i nakonechniki). Kiev, Izd-vo "Naukova dumka", 1965. 180 p. illus., biblio. (At head of title: Akademiya nauk Ukrainskoy SSR. Institut problem materialovedeniya) 1700 copies printed.

TOPIC TAGS: heat transfer, metallic thermocouple, nonmetallic thermocouple, refractory compound, thermocouple, thermocouple sheath

PURPOSE AND COVERAGE: This book is intended for scientists and engineers conducting research in the field of physics and engineering and automation in metallurgy; it may also be useful to personnel in plant laboratories and to students and aspirants concerned with metallurgy and heat power engineering. The book describes methods for producing thermoelectrodes and thermocouples. Particular attention is given to high-temperature nonmetallic thermocouples and sheathing of metallic thermocouples. No personalities are mentioned. There are 227 references: 147 Soviet, 36 in English, 22 unidentified, 18 German, 3 French and 1 Polish.

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L 50198-65
AM5014981

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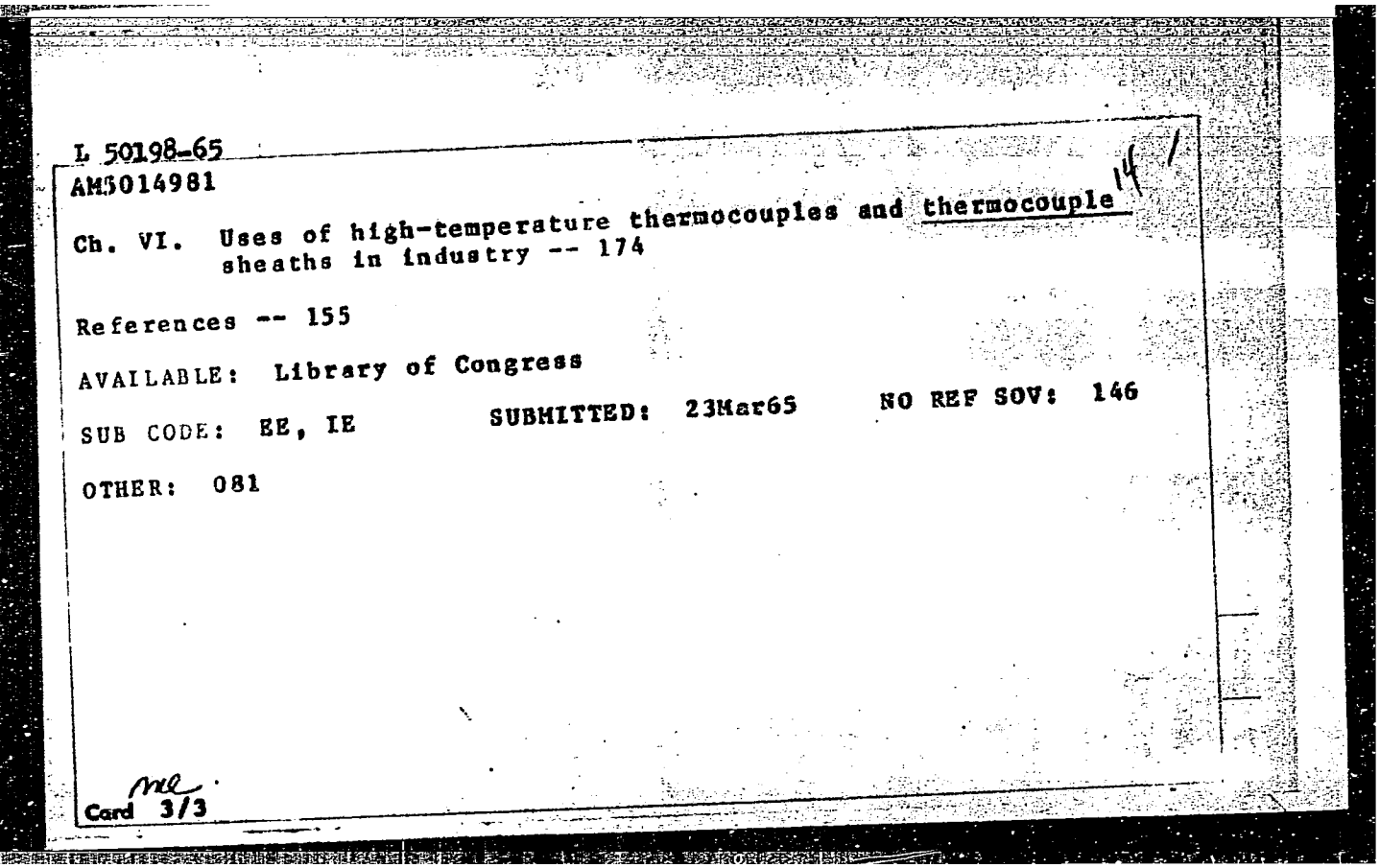

L 50198-65
AM5014981

Ch. VI. Uses of high-temperature thermocouples and thermocouple sheaths in industry -- 174

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AVAILABLE: Library of Congress

SUB CODE: EE, IE SUBMITTED: 23Mar65 NO REF SOV: 146

OTHER: 081

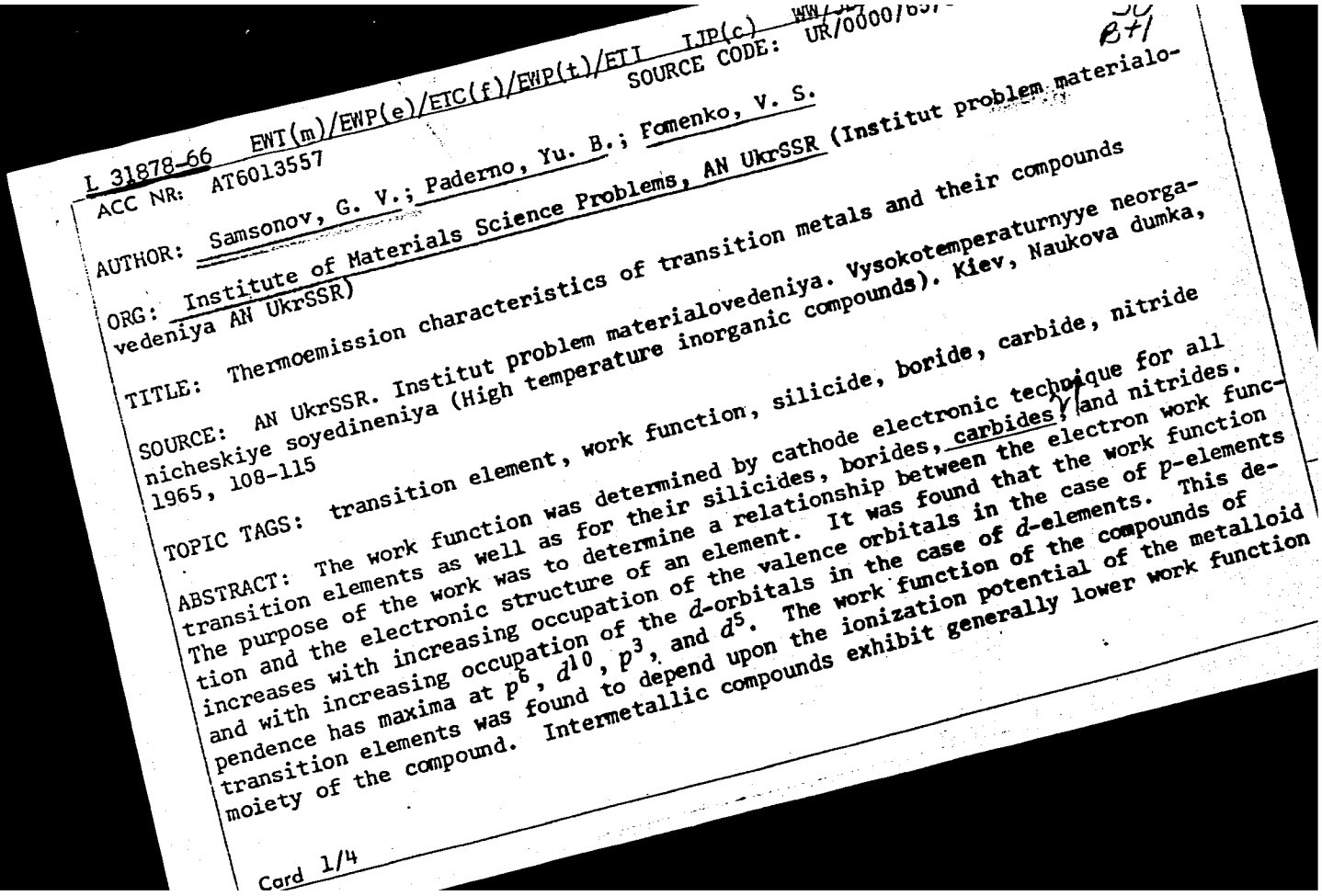
Card 3/3

SAMSONOV, G. V. SLEPTSOV, V. M.; KRASNOV, A. N.; PRSHEDROMIRSKAYA, Ye. M.

"Methoden zur erzeugung kugeliger teilchen hochschmelzender metalle und verbindungen."

report submitted for 3rd Intl Conf on Powder Metallurgy, Eisenach, E. Germany, 13-15 May 1965.

Kiev, UkSSR.



L 31878-66 EWT(m)/EWP(e)/ETC(f)/EWP(t)/ETI IJP(c) WW/JD/ SOURCE CODE: UR/0000/65/ 56 B+1

ACC NR: AT6013557

AUTHOR: Samsonov, G. V.; Paderno, Yu. B.; Fomenko, V. S.

ORG: Institute of Materials Science Problems, AN UkrSSR (Institut problem materialovedeniya AN UkrSSR)

TITLE: Thermoemission characteristics of transition metals and their compounds

SOURCE: AN UkrSSR. Institut problem materialovedeniya. Vysokotemperaturnyye neorganicheskiye soyedineniya (High temperature inorganic compounds). Kiev, Naukova dumka, 1965, 108-115

TOPIC TAGS: transition element, work function, silicide, boride, carbide, nitride

ABSTRACT: The work function was determined by cathode electronic technique for all transition elements as well as for their silicides, borides, carbides, and nitrides. The purpose of the work was to determine a relationship between the electron work function and the electronic structure of an element. It was found that the work function increases with increasing occupation of the valence orbitals in the case of p-elements and with increasing occupation of the d-orbitals in the case of d-elements. This dependence has maxima at p^6, d^{10}, p^3, and d^5. The work function of the compounds of transition elements was found to depend upon the ionization potential of the metalloid moiety of the compound. Intermetallic compounds exhibit generally lower work function

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values than compounds involving nonmetals. The dependence of the work function of several elements and their compounds upon the atomic number of the elements is shown in figure 1. The dependence of the work function of transition elements and their compounds upon the degree of occupation of the *d*-orbitals of the metal atoms is shown in figure 2. Orig. art. has: 2 figures, 2 tables.

ACC NR: AT6013557

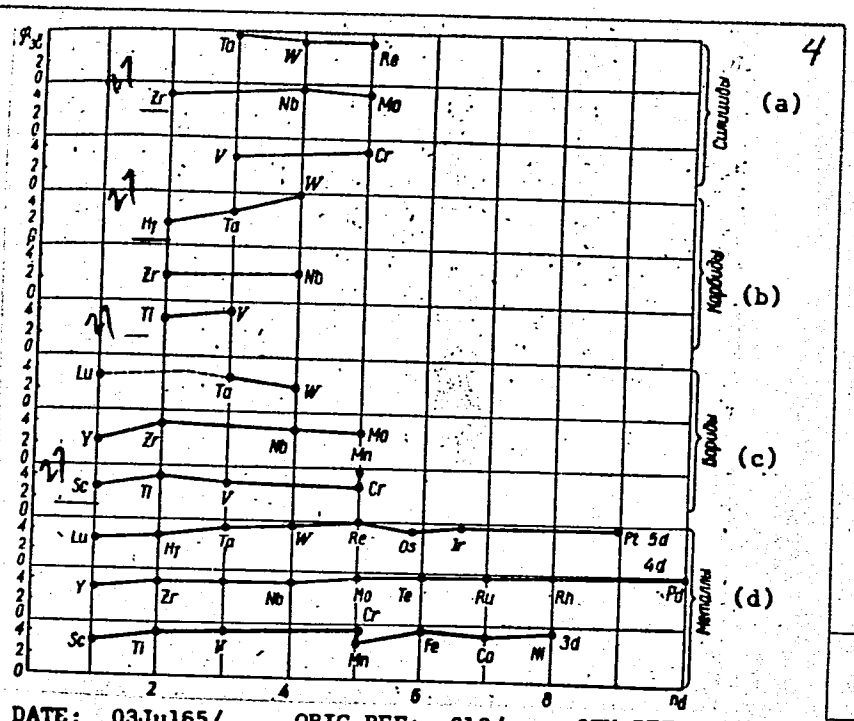


Fig. 2. a--silicides; b--carbides; c--borides; d--metals

SUB CODE: 07,11/ SUBM DATE: 03Jul65/ ORIG REF: 018/ OTH REF: 001

Card 4/4 PP

NAZARCHUK, Tamara Nikolayevna; POPOVA, Oksana Ivanovna; SAMSONOV, G.V., otv. red.; POGORETSKAYA, L.N., red.; FURER, P.Ya., red.

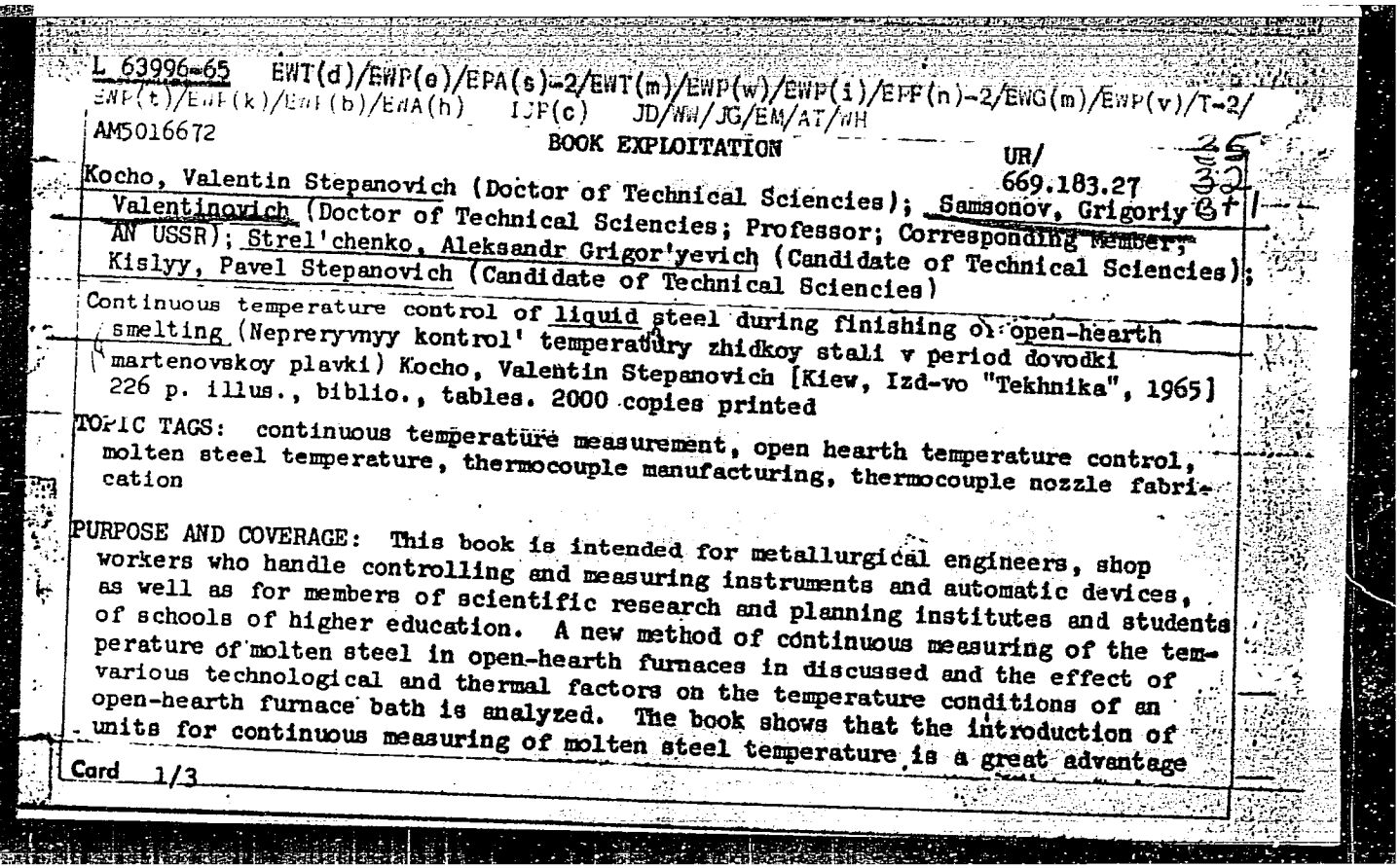
[Complexometric analysis of ceramic metal and ceramic materials and of certain alloys] Kompleksometricheskii analiz metallokeramicheskikh i keramicheskikh materialov i nekotorykh splavov. Kiev, Naukov dumka, 1965. 120 p. (MIRA 18:9)

1. Chlen-korrespondent AN Ukr.SSR (for Samsonov).

SAMSONOV, G.V., otv. red.; POGORETSKAYA, L.N., red.; FURER, P.Ya., red.

[Diffusion coatings on metals; reports] Diffuzionnye pokrytiia na metallakh; doklady. Kiev, Naukova dumka, 1965. 141 p. (MIRA 18:9)

1. Akademiya nauk URSR, Kiev. Seminar po diffuzionnomu nasyshcheniyu metallov i pokrytiyam iz tugoplavykh soyedineniy. 2. Chlen-korrespondent AN Ukr.SSR (for Samsonov).



L 63996-65 EWT(d)/EWP(e)/EPA(s)-2/EWT(m)/EWP(w)/EWP(i)/EPF(n)-2/EWG(m)/EWP(v)/T-2/
EWP(t)/EWP(k)/EWP(b)/EWA(h) IJP(c) JD/WW/JG/EM/AT/WH

AM5016672

BOOK EXPLOITATION

UR/
669.183.27

Kocho, Valentin Stepanovich (Doctor of Technical Sciencies); Samsonov, Grigoriy Valentinovich (Doctor of Technical Sciencies; Professor; Corresponding Member; AN USSR); Strel'chenko, Aleksandr Grigor'yevich (Candidate of Technical Sciencies); Kislyy, Pavel Stepanovich (Candidate of Technical Sciencies)

Continuous temperature control of liquid steel during finishing of open-hearth smelting (Nepreryvnyy kontrol' temperatury zhidkoy stali v period dovodki martenovskoy plavki) Kocho, Valentin Stepanovich [Kiew, Izd-vo "Tekhnika", 1965] 226 p. illus., biblio., tables. 2000 copies printed

TOPIC TAGS: continuous temperature measurement, open hearth temperature control, molten steel temperature, thermocouple manufacturing, thermocouple nozzle fabrication

PURPOSE AND COVERAGE: This book is intended for metallurgical engineers, shop workers who handle controlling and measuring instruments and automatic devices, as well as for members of scientific research and planning institutes and students of schools of higher education. A new method of continuous measuring of the temperature of molten steel in open-hearth furnaces in discussed and the effect of various technological and thermal factors on the temperature conditions of an open-hearth furnace bath is analyzed. The book shows that the introduction of units for continuous measuring of molten steel temperature is a great advantage

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AM5016672

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from the standpoint of engineering economy. It boosts the furnace output, improves the steel quality, reduces the amount of rejected material, and decreases the fuel consumption.

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Ch. V. Economic Effectiveness of Continuous Measuring of Liquid Steel Temperature During the Finishing of Open-hearth Smelting -- 211

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SUB CODE: MM SUBMITTED: 02Feb65 NO REF SOV: 118

OTHER: 010

Card 3/3

L 31874-66 EWT(m)/EWP(w)/T/EWP(t)/ETI IJP(c) GD/JD/WH
ACC NR: AT6013561 (A) SOURCE CODE: UR/0000/65/000/000/0237/0242

AUTHOR: L'vov, S. N.; Nemchenko, V. F.; Kosolapova, T. Ya.; Samsonov, G. V.

ORG: Institute of Materials Science Problems AN UkrSSR (Institut problem materialovedeniya AN UkrSSR)

TITLE: Effect of carbon on physical properties of titanium carbide in the range of its homogeneity

SOURCE: AN UkrSSR. Institut problem materialovedeniya. Vysokotemperaturnyye neorganicheskiye soyedineniya (High temperature inorganic compounds). Kiev, Naukova dumka, 1965, 237-242

TOPIC TAGS: titanium, carbide, nonferrous metal, titanium compound

ABSTRACT: The effect of carbon content (from 18-50 atm % C) on specific resistance and temperature dependence of thermal electromotive force of titanium carbide was studied in the 20°-1200°C range. The Hall coefficient and magnetic susceptibility were also measured at room temperature. The object of the work was to verify data in the literature. The results of the work are summarized in figs. 1-4. Orig. art. has: 4 figures, 1 table.

Card 1/3

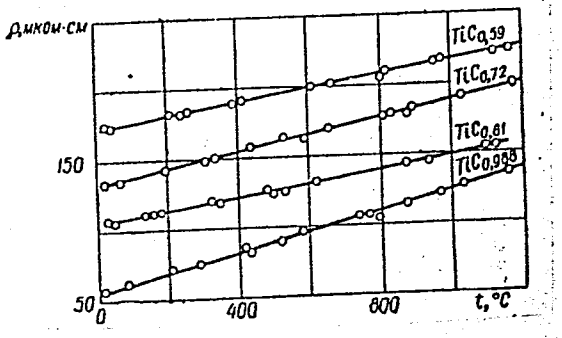

Fig. 1. Temperature dependence of specific resistance of titanium carbide.

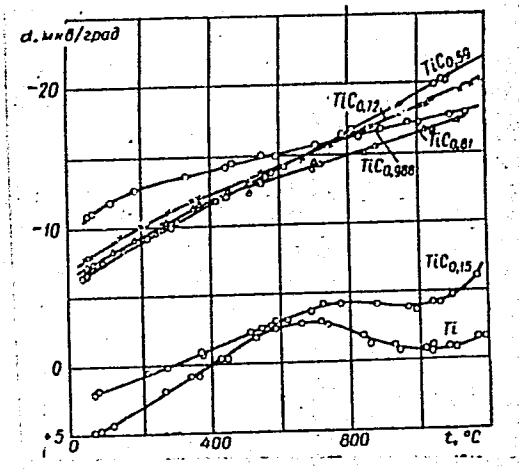

Fig. 2. Temperature dependence of the coefficient of thermal electromotive force of titanium and titanium carbide.

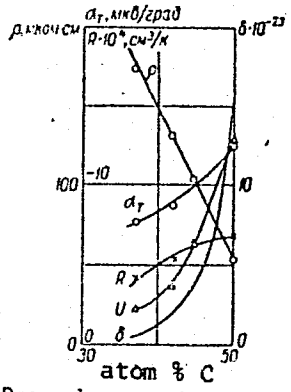

Fig. 3. Dependence of the specific resistance (G), the Hall coefficient (R), the thermal electromotive force (α_T) and the mobility of current carriers (u) and the difference $\delta = n^- u^{-2} - n^+ u^{+2}$ on the carbon content in titanium carbide.

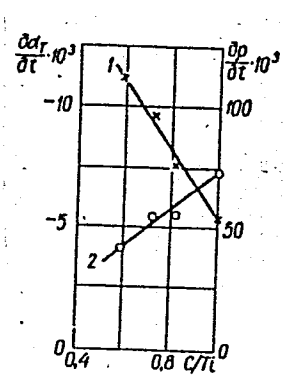

Fig. 4. The dependence of the slope of the ρ-temperature, line (1), and the α_T-temperature, line (2), upon carbon content in titanium carbide.

SUB CODE: 07,11/ SUBM DATE: 03Jul65/ ORIG REF: 006/ OTH REF: 003

Card 3/3 PB

L 31875-66 EWT(m)/ETC(f)/EWP(e)/EWP(w)/ETI/EWP(t)/T IJP(c) AT/WH/GD/JG/JD

ACC NR: AT6013563 SOURCE CODE: UR/0000/65/000/000/0250/0256

AUTHOR: Samsonov, G. V.; Makarenko, G. N.; Krushinskiy, A. N.

ORG: Institute of Material Science Problems, AN UkrSSR (Institut problem materialovedeniya AN SSSR); Kiev Order of Lenin Polytechnic Institute (Kiyevskiy ordena Lenina politekhnicheskiy institut)

TITLE: Investigation of the condition of formation of solid solutions of carbides involving scandium carbide

SOURCE: AN UkrSSR. Institut problem materialovedeniya. Vysokotemperaturnyye neorganicheskiye soyedineniya (High temperature inorganic compounds). Kiev, Naukova dumka, 1965, 250-256

TOPIC TAGS: solid solution, carbide, scandium, scandium compound, nonferrous metal, tungsten, titanium, carbon alloy

ABSTRACT: The conditions of formation of the WC+ScC solid solutions in the WC to ScC mole ratio from 1:4 to 4:1 were investigated in vacuo in the 1000-2000°C range. The formation of WC+TiC+ScC solid solutions was investigated in vacuo and in hydrogen in the 1000-2500°C range. The solid solution products were examined for

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ACC NR: AT6013563

microhardness. The carbide solid solutions were prepared by reduction of the suitable oxide mixtures by carbon. It was found that the optimum conditions for preparing a solid solution containing 20 mole% ScC and having maximum microhardness are obtained by heating a stoichiometric mixture of oxides with carbon at 1900°C for 1 hr. In the case of reduction in vacuo, the optimum conditions of formation of WC+TiC+ScC solid solutions are: heating of a suitable oxide and carbon mixtures for 1 hr at 2000°C or in the case of carbidization in a Tamman furnace, a two-time heating of a $WC+TiO_2+Sc_2O_3+C$ mixture for 1 hr at 2100°C or heating of a $W+Sc_2O_3+TiO_2+C$ mixture for 1 hr at 2500°C. In general, the mere presence of scandium carbide increases the hardness of the other transition element carbides. Orig. art. has: 1 figure and 4 tables.

SUB CODE: 07,11/ SUBM DATE: 03Jul65/ ORIG REF: 002/ OTH REF: 000

Card 2/2

L 32676-66 EWT(1)/EWT(m)/EWP(w)/T/EWP(t)/ETI IJP(c) JD/WW/GD

ACC NR: AT6013566 (A) SOURCE CODE: UR/0000/65/000/000/0278/0285

AUTHOR: Samsonov, G. V.; Fomenko, V. S.; Paderno, V. N.; Rud', B. M.

ORG: Institute of Material Science Problems, AN UkrSSR (Institut problem materialovedeniya AN UkrSSR)

TITLE: Thermal emission characteristics of alloys of isomorphic carbides

SOURCE: AN UkrSSR. Institut problem materialovedeniya. Vysokotemperaturnyye neorganicheskiye soyedineniya (High temperature inorganic compounds). Kiev, Naukova dumka, 1965, 278-285

TOPIC TAGS: heat radiation, zirconium carbide, tantalum compound, hafnium compound, niobium compound, work function, CARBIDE

ABSTRACT: The concentration dependence of the thermal emission properties of the TaC-ZrC-, TaC-HfC-, and HfC-NbC carbide system was studied in the 1100°-2500°C range. The carbide samples were prepared by fusing suitable mixtures of oxides with carbon at 2500°-2700°C. At the fusion temperature, the carbide samples were pressed into tablets and machined into bars 6 mm in diameter and 0.6-0.7 mm in length. The measurements were taken at $3\text{-}5\cdot10^{-6}$ mm Hg pressure. It was found that the work function of the isomorphic carbide mixtures is generally greater than the work function of the corresponding individual carbides. This is due to the stronger interaction among the

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metal atoms within the isomorphic mixed carbides. It was also found that the thermal emission properties of the solid solutions are a function of electron receptivity of the metal atoms and of the stability of the d^5-shell configuration of the mixed carbide systems. The dependence of the work function upon temperature for the mixed carbides is shown in figure 1. The dependence of the effective work function at 2000°K upon mixed carbide composition is shown in figure 2. Orig. art. has: 4 figures, 1 table.

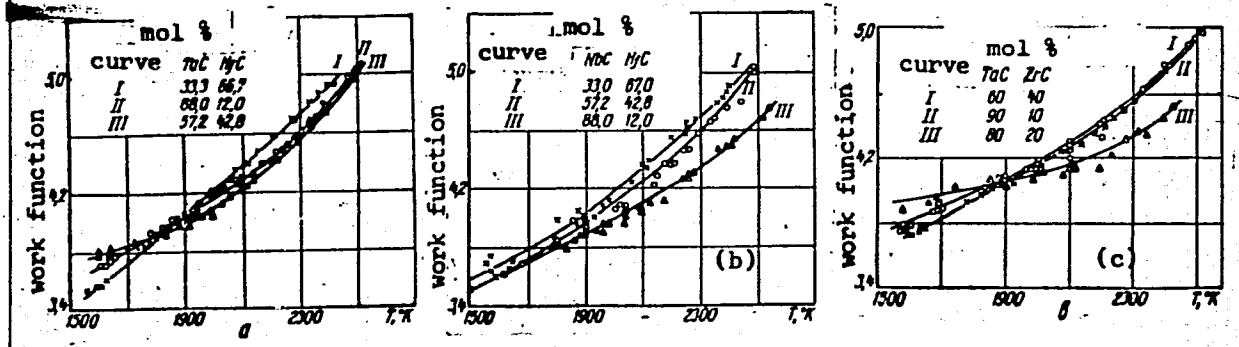

Fig. 1. The dependence of the work function upon temperature for TaC-HfC (a); NbC--HfC (b), and TaC-ZrC (c).

L 32676-66

ACC NR: AT6013566

0

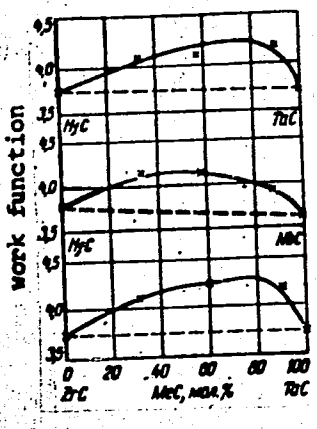

Fig. 2. The dependence of the effective work function at 2000°K upon composition of the TaC-HfC, NbC-HfC, and TaC-ZrC systems.

SUB CODE: 07/ SUBM DATE: 03Jul65/ ORIG REF: 012/ OTH REF: 005

Card 3/3 BLG

L 32670-66 EWT(m)/EWP(e)/T/EWP(t)/ETI IJP(c) ES/JD/WW/JG/GG/GD/WH

ACC NR: AT6013574 SOURCE CODE: UR/0000/65/000/000/0456/0464

AUTHOR: Koval'chenko, M. S.; Samsonov, G. V.

ORG: Institute of Material Science Problems, AN UkrSSR (Institut problem materialovedeniya AN UkrSSR)

TITLE: Investigation of the behavior of nonmetallic materials used in atomic reactors, subjected to neutron irradiation

SOURCE: AN UkrSSR. Institut problem materialovedeniya. Vysokotemperaturnyye neorganicheskiye soyedineniya (High temperature inorganic compounds). Kiev, Naukova dumka, 1965, 456-464

TOPIC TAGS: neutron irradiation, boride, carbide, ~~solid mechanical property~~ NUCLEAR REACTOR MATERIAL, HIGH TEMPERATURE CERMET MATERIAL, HARDNESS

ABSTRACT: The literature on the effect of neutron irradiation on structure and mechanical properties of TiB_2, TiB_2-Ti cermet, FeB_1Fe_2B, GaB_6, Cr-Al_2O_3 cermet, SiC, Ti_2C, Mo_2C, UC, UC_2 and Mo_2C_1 is reviewed. The behavior of these high temperature materials under 10^{16}-10^{21} neutrons/cm^2 density and 0°-1000°C range indicates their usefulness for various applications in nuclear reactors. Under neutron irradiation of boron-containing materials the following cleavage reaction occurs

$$_5B^{10} + {}_0n^1 = {}_3Li^7 + {}_2He^4.$$

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L 32670-66

ACC NR: AT6013574

It was found that the stability of borides declines with increasing covalent character of the bondings within boride crystals. The neutron irradiation of high temperature materials results in their increased hardness. The increase in microhardness $\Delta H=H-H_0$ (where H_0 is microhardness of nonirradiated material) due to irradiation with 10^{16} and 10^{18} neutrons/cm^3 is 31.8% and 37.5% respectively for titanium carbide, 46.5% and 50.0% respectively for molybdenum carbide, and 56.8% and 63.3% for GaB_6. Orig. art. has: 6 figures, 3 formulas.

SUB CODE: 18,07/ SUBM DATE: 03Jul65/ ORIG REF: 017/ OTH REF: 021

Card 2/2 BLG

L 48602-65 EWP(e)/EWT(m)/EWP(w)/EPF(n)-2/EWG(m)/EWA(d)/T/EWP(t)/EWP(k)/EPR/
EWP(z)/EWP(b)/EWA(c) Pf-4/Ps-4/Pu-4
ACCESSION NR: AP5009274 IJP(c) JD/WW/JG/AT/WH S/0370/65/000/001/0180/0188

AUTHOR: Samsonov, G. V. (Kiev); Paderno, V. N. (Kiev)

TITLE: Synthesis and investigation of the physical properties of the solid solutions of Ti, Zr, Nb, and Ta carbides with Hf carbide

SOURCE: AN SSSR. Izvestiya. Metally, no. 1, 1965, 180-188

TOPIC TAGS: titanium carbide alloy, hafnium carbide containing alloy, zirconium carbide alloy, niobium carbide alloy, tantalum carbide alloy, alloy property

ABSTRACT: A series of binary TiC-HfC and ZrC-HfC alloys containing 20—80 mol% HfC, and binary NbC-HfC and TaC-HfC alloys containing 11—67 mol% HfC were synthesized by combined reduction with carbon of the mixtures of oxides of corresponding metals at 1000C and simultaneous compacting of the reduction products under a pressure of 180 kg/cm^2, followed by sintering at 2200C. The synthesis required about 30 min; the finished products had a 25% porosity. Subsequent powdering, followed by compacting under a pressure of 300 kg/cm^2 and sintering at 2500—2700C for 5 min produced dense alloys with a porosity of 5—7%. The investigated carbides formed continuous series of solid solutions. Changes in the lattice constants of HfC-ZrC alloys indicated a stronger atom interaction in the solid-solution systems, compared

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L 48602-65

ACCESSION NR: AP5009274

with individual carbides. The thermal expansion coefficient in HfC-NbC and HfC-ZrC alloys was lower than in individual carbides. The expansion coefficient in the HfC-TaC system was particularly small, and the melting temperature correspondingly high. An 80 mol% TaC—20 mol% HfC alloy has a melting temperature of 4050 ±50C. The microhardness of TaC-HfC and NbC-HfC alloys approached the microhardness of HfC with additions of up to 10% HfC and remained practically constant with further additions. Correlation of the obtained data showed that the changes in the physical properties of the solid solutions of carbides are determined by the relationship between the acceptor capacity of the metal atoms and the probability of forming stable electron configurations of the d^5 type. Orig. art. has: 8 figures and 3 tables. [MS]

ASSOCIATION: none

SUBMITTED: 020ct63 ENCL: 00 SUB CODE: MM

NO REF SOV: 013 OTHER: 012 ATD PRESS: 3251

Card 2/2

L 35104-65 EPR/EWT(m)/EWP(b)/T/EWA(d)/EWP(t) Ps-4 IJP(c) MJW/JD

ACCESSION NR: AP5006185 S/0226/65/000/002/0001/0003

AUTHOR: Samsonov, G. V.; Repkin, Yu. D.

TITLE: Nitriding of aluminum powder under pressure

SOURCE: Poroshkovaya metallurgiya, no. 2, 1965, 1-3

TOPIC TAGS: aluminum, aluminum powder, aluminum powder nitriding, aluminum nitride synthesis, aluminum nitride property.

ABSTRACT: The effect of pressure and temperature on the yield of aluminum nitride in nitriding of PAK-4 (fine) and PA-4 (coarse) aluminum powders has been investigated. The PAK-4 powder was nitrided under a nitrogen pressure of 196 or 294 kn (2 and 3 atm) at 600—800C, and the PA-4 powder under a nitrogen pressure of 98 or 294 kn (1 and 3 atm) at 700—1000C. The duration of nitriding in both cases was 60—120 min. In the case of PAK-4 powder, high nitrogen pressures produced greater yields of aluminum nitride, but only at temperatures below the aluminum melting point. At 665—765C, however, the yield obtained under low nitrogen pressures was greater than that obtained under high pressures. In the case of PA-4 powder, increasing nitrogen pressure increased the yield of nitride at all the tested temperatures. The difference in the effect of pressure is explained by the different sizes of aluminum drops formed at temperatures above the aluminum melting point. Orig. art. has: 2 figures. [WW]

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L 35104-65

ACCESSION NR: AP5006185

ASSOCIATION: Institut problem materialovedeniya AN UkrSSR(Institute of Metal-Working Problems, AN UkrSSR)

SUBMITTED: 12Feb64 ENCL: 00 SUB CODE: MM

NO REF SOV: 004 OTHER: 006 ATD PRESS: 3209

Card 2/2

L 58968-65 EPF(n)-2/EPA(w)-2/EWT(1)/EWT(m)/EWP(k)/EWP(z)/EWG(m)/EWP(b)/EWP(e)/EWP(t) IJP(c) /Po-4/Pu-4/Pz-6 /Pf-4/Pi-4

ACCESSION NR: AP5017471 UR/0370/65/000/003/0070/0072
669:621.762.001

55
B

AUTHOR: Krasnov, A. N. (Kiev); Samsonov, G. V. (Kiev); Sleptsov, V. M. (Kiev)

TITLE: Production of copper, molybdenum, and tungsten powders by atomization with a plasma jet

SOURCE: AN SSSR. Izvestiya. Metally, no. 3, 1965, 70-72

TOPIC TAGS: copper powder, molybdenum powder, tungsten powder, spherical particle powder, plasma jet atomization

ABSTRACT: The production of copper, molybdenum, and tungsten powders with spherical particles 100—400 μ in size by means of plasma-jet atomization has been investigated. Metal wire 1 mm in diameter was fed at a speed of 7.0 m/min and the plasma-forming gas (argon) was fed under a pressure of 1.2 atm at a rate of 35 l/m. The arc gap was 7 mm. Atomized powders were cooled in water or engine oil. The distance between the torch nozzle and the cooling medium was varied from 120 to 1500 mm. Copper and molybdenum powders with spherical particles were produced with cooling in water or oil, regardless of the distance between the torch nozzle and the cooling medium. Tungsten powders with spherical particles were obtained when the torch

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L 58968-65
ACCESSION NR: AP5017471

nozzle was more than 1200 mm distant from the cooling medium, regardless of the nature of the cooling medium. At smaller distances the powder particles had irregular shapes. Orig. art. has: 3 figures and 1 table. [MS]

ASSOCIATION: none

SUBMITTED: 24Mar64 ENCL: 00 SUB CODE: MM,ME

NO REF SOV: 001 OTHER: 002 ATD PRESS: 4048

Card 2/2

L 51078-65 EWT(d)/EWT(l)/EWP(e)/EWT(m)/EWP(i)/EPF(n)-2/EWP(c)/EWA(d)/EWP(v)/EPR/T/EWP(t)/EWP(k)/EWP(h)/EPA(bb)-2/EWP(b)/EWP(l) Pz-6/Pf-4/Pt-7/Pu-4/Ps-4 IJP(c) JD/WW/JG/AT/WH UR/0131/65/000/004/0028/0032 68 B

ACCESSION NR: AP5010414

AUTHOR: Samsonov, G.V.; Kislyy, P.S.

TITLE: Protective thermocouple jackets for the continuous regulation of the temperature of molten metals

SOURCE: Ogneupory, no. 4, 1965, 28-32

TOPIC TAGS: temperature regulation, foundry technology, thermocouple jacket, jacket material, zirconium diboride, liquid steel temperature, open hearth furnace

ABSTRACT: The Sektor tugoplavkikh materialov Instituta problem materialovedeniya AN UkrSSR (Refractory Materials Section of the Institute of Materials Science Problems, AN UkrSSR) has developed a technological process for the production of zirconium diboride (ZrB_2) jackets for thermocouples, which are used for the continuous measurement of the temperature of liquid steel in open-hearth furnaces. The positioning in the furnace, conditions of operation, and durability of such thermocouples are described. Also discussed is the use of zirconium diboride jackets with thermocouples employed in oxygen-blown converters and bottom-blown Bessemer converters. The addition of 5% molybdenum to zirconium diboride has shown positive results in periodic temperature measure-

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L 52078-65

ACCESSION NR: AP5010414

3

of liquid cast iron at the Volgogradskiy traktornyy zavod (Volgograd Tractor Factory). Studies made at the Kommunarsk and other metallurgical plants showed that the continuous measurement of the temperature of the liquid metal in the bath of an open-hearth furnace by means of thermocouples with ZrB_2 jackets makes it possible to reduce the spoilage by 30%. Continuous temperature measurement permits the elimination of overheating of the metal, acceleration of the melting, and automation of temperature control. Orig. art. has: 5 figures.

ASSOCIATION: Institut problem materialovedeniya AN UkrSSR (Institute of Materials Science Problems, AN UkrSSR)

SUBMITTED: 00 ENCL: 00 SUB CODE: MM, TD

NO REF SOV: 021 OTHER: 000

Card 2/2

L 34073-65 EWT(m)/EWP(b)/EWP(t) IJP(c) JD/JG

ACCESSION NR: AP5007605 S/0363/65/001/001/0047/0052

23
22
B

AUTHOR: Marchenko, V. I.; Samsonov, G. V.

TITLE: Preparation and some physicochemical properties of lanthanum sulfides 27 27

SOURCE: AN SSSR. Izvestiya. Neorganicheskiye materialy, v. 1, no. 1, 1965, 47-52

TOPIC TAGS: lanthanum sulfide, rare earth sulfide, semiconductor, lanthanum sulfide electrical property, magnetic susceptibility

ABSTRACT: The authors investigated the preparation of compact specimens of LaS and La_2S_3, as well as the electrical resistance of these semiconductors. Briquettes pressed from fine La_2S_3 were sintered in a stream of H_2S by heating at 10C/min. to 1300-1400C and holding for 30-45 min. at this temperature; the sintered material attained 84-87% of the calculated maximum density. Heating at 1400-1450C reduced porosity further but also formed large blowholes. Coarse grinding of this sinter, dampening with water, pressing into briquettes and resintering in H_2S at 1300-1400 produced better results. Heating LaS briquettes was found to lead to a final porosity of 7.5-12.5%. The electrical resistivity (ohm.cm) of LaS varies between 9.2×10^{-5} and 22.0×10^{-5} in the 20 -950 C range, and that of La_2S_3 varies between

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L 34073-65

ACCESSION NR: AP5007605

1.5- 2 x 10^6 and 80-100 over the same temperature range. The resistivity/temperature curves of La_2S_3 show two rectilinear sections with a different slope corresponding to different values of the energy gap, which is characteristic of semiconductors with admixture atoms within the energy gap. The width of the energy gap shows that the displacement of the electron density maximum in the La_2S_3 lattice corresponds to a partial organization of covalent S - S bonds. These results were checked by repeated heating. The electrical resistivity of LaS depends on temperature in the same way as that in metals. The magnetic susceptibility agreed well with the published data, La_2S_3 always showing diamagnetic and LaS paramagnetic magnetization. Orig. art. has: 5 figures, 1 formula and 1 table.

ASSOCIATION: Institut problem materialovedeniya, Akademiya Nauk UkrSSR (Material science problems institute, Academy of sciences, UkrSSR)

SUBMITTED: 13Aug62 ENCL: 00 SUB CODE: IC, MT

NO REF SOV: 007 OTHER: 006

Card 2/2

L 58712-65 EWT(l)/EWP(e)/EWT(m)/EWP(w)/EWP(i)/EPF(n)-2/EWG(m)/EWA(d)/EPR/T/EWP(t)/EWP(b)/EWA(h)/EWA(c) Pz-6/Ps-4/Peb/Pu-4 IJP(c) JD/JG/AT/WH

ACCESSION NR: AP5016579 UR/0363/65/001/005/0655/0662

546.119'281.004.12

AUTHOR: Neshpor, V. S.; Samsonov, G. V.

TITLE: Electronic structure, chemical bonding, and physical properties of rhenium disilicide and its alloys

SOURCE: AN SSSR. Izvestiya. Neorganicheskiye materialy, v. 1, no. 5, 1965, 655-662

TOPIC TAGS: rhenium silicide, molybdenum silicide, tungsten silicide, chromium silicide, rhenium alloy, silicide structure, semiconductor

ABSTRACT: A comparison was drawn between the crystal structure, electronic structure, and chemical bonds in the silicides $MoSi_2$, WSi_2, and $ReSi_2$ and their electrical properties. The causes of the semiconducting properties of rhenium disilicide and of the metallic properties of molybdenum disilicide and tungsten disilicide, which are isomorphous with rhenium disilicide, were elucidated. It was shown that in the system $ReSi_2$ - $MoSi_2$, a continuous series of solid solutions is formed having a conductivity that changes continuously from semiconducting in $ReSi_2$ to metallic in $MoSi_2$; there is a simultaneous increase in the proportion of electron conduction and a decrease in the proportion of hole conduction. Alloys of a system composed of the two semiconducting silicides $ReSi_2$ and $CrSi_2$ were studied, and these silicides were shown to form a pseudobinary eutectic

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L 58712-65

ACCESSION NR: AP5016579

2 18

system of limited solubility in the solid state; at the same time, the electrical resistance of both solid solutions increases sharply with rising concentration of the dissolving component, while the thermal conductivity decreases. An examination of the nature of the change in the thermal and electrical properties showed that it is primarily determined by the difference in the atomic radii of the metallic components of the disilicides, their acceptor capacity, and the formal valence. Orig. art. has: 9 figures.

ASSOCIATION: Institut problem materialovedeniya Akademii nauk UkrSSR (Institute of Materials Science Problems, Academy of Sciences, UkrSSR)

SUBMITTED: 25Jan65 ENCL: 00 SUB CODE: IC, MM

NO REF SOV: 019 OTHER: 008

dm

Card 2/2

L 61073-65 EWA(c)/EWT(m)/EWP(1)/EWP(b)/T/EWA(d)/EWP(e)/EWP(w)/EWP(t) Ps-4
ACCESSION NR: AP5018275 IJP(c) JD UR/0226/65/000/007/0067/0073

32
31
B

AUTHOR: Neronov, V. A.; Samsonov, G. V. 44

TITLE: Methods of preparation and properties of aluminum borides 27 44, 27

SOURCE: Poroshkovaya metallurgiya, no. 7, 1965, 67-73

TOPIC TAGS: aluminum boride, boron solid solution, neutron capture

ABSTRACT: The article surveys the literature on the aluminum - boron system (between 500 and 2200C) and on the methods of preparation and certain properties of aluminum borides. The Al-B system is characterized by a large number of peritectic transformations. The 1450-1550C interval has not been studied because of the impurities present in the samples. The solubility of boron in aluminum in the solid state has not been determined because the change in the period of identity for aluminum and the alloys is within the range of experimental error. After reviewing the methods of preparation of AlB_2 (from the elements), AlB_{12} (aluminothermy), and AlB_{10} (from the elements and aluminothermy), the authors discuss the structure and physicochemical characteristics of these compounds. The latter have a low density, high melting points, are chemically stable, and have large thermal-neutron capture cross-sections; they have numerous applications

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L 61073-65
ACCESSION NR: AP5018275

in various areas of modern technology. Orig. art. has: 1 figure and 2 tables.

ASSOCIATION: Institut problem materialovedeniya AN UkrSSR (Institute of Materials Science Problems, AN UkrSSR)

SUBMITTED: 15Jul64 ENCL: 00 SUB CODE: MM, NP

NO REF SOV: 010 OTHER: 029

Card 2/2

L 1680-66 EWP(e)/EWT(m)/EWP(i)/EWP(t)/EWP(b) IJP(c) JD/JG

ACCESSION NR: AP5020773 UR/0226/65/000/008/0070/0073

AUTHOR: Gordiyenko, S. P.; Samsonov, G. V.; Fesenko, V. V. 36 34 B

TITLE: Study of the evaporation of lanthanum hexaboride

SOURCE: Poroshkovaya metallurgiya, no. 8, 1965, 70-73

TOPIC TAGS: lanthanum 57 compound, boride 57 lanthanum, heat change of state, vaporization, tungsten, cathode ray

ABSTRACT: The object of the study was to determine the composition of the vapor and of the heat of sublimation of lanthanum hexaboride. The investigation was carried out on a MI-1305 mass spectrometer. Source of the vapor was a chamber made of tantalum with a thickness of 0.03 mm, with apertures of 0.1-0.14 mm. Temperature measurement in the chamber was done with a OMP-019 pyrometer. Results show that lanthanum hexaboride evaporates chiefly as atomic lanthanum. The heat of dissociation of the reaction was determined as 561 kilojoules/mole. It is of particular interest that the emission of a tungsten cathode increases when

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L 1680-66

ACCESSION NR: AP5020773

2

lanthanum is powdered onto it. In accordance with the quantum theory of film type cathodes, when lanthanum is powdered on the surface, there takes place a "suction" of the electron of the electropositive atom, in the given case lanthanum, into the lattice of the tungsten absorbent. The sublimation heat of lanthanum hexaboride is estimated at 536 ±8.8 kg/mole at a temperature of 2200 K. Orig. art. has: 2 formulas and 1 figure

ASSOCIATION: Institut problem materialovedeniya AN USSR (Institute for Problems of Materials Processing, AN UkrSSR)

SUBMITTED: 20Aug64 ENCL: 00 SUB CODE: IC, MM

NR REF SOV: 007 OTHER: 002

Card 2/2 DP

L 4025-66 EWP(e)/EWT(m)/EWP(t)/EWP(k)/EWP(z)/EWP(b) IJP(c) JD
ACCESSION NR: AP5022256 UR/0363/65/001/007/1071/1078
546.3'621:541.5

79
73
B

AUTHOR: Samsonov, G. V.; Sinel'nikova, V. S.
44,55 44,55

TITLE: Study of the nature of chemical bonding in aluminides of certain transition metals

SOURCE: AN SSSR. Izvestiya. Neorganicheskiye materialy, v. 1, no. 7, 1965, 1071-1078

TOPIC TAGS: aluminum compound, transition element, chemical bonding, electric conductivity, electric resistance, thermoelectromotive force

ABSTRACT: Compact samples of aluminides of certain transition metals (Ti, V, Cr, Mn, Ni, Zr, Nb, Mo, Hf, Ta, Re) were prepared by sintering of powdered aluminides. The electrical resistivity was measured as a function of temperature between 20 and 1100C, and relationships were established between the electrical resistivity and the relative content of aluminum, probability of scattering of charge carrier by the transition metal atoms, and the acceptor capacity of these atoms. The temperature dependence of the absolute differential thermo-emf of the aluminides was also investigated. The results obtained are explained in terms

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L 4025-66
ACCESSION NR: AP5022256

of the concept of formation of stable configurations approaching the d^5 type in transition metal atoms and the sp^2 type in aluminum atoms upon the formation of aluminides. Orig. art. has: 6 figures and 2 tables.

ASSOCIATION: Institut problem materialovedeniya Akademii nauk UkrSSR, Kiev (Institute of Materials Science Problems, Academy of Sciences UkrSSR)

SUBMITTED: 21Oct64 ENCL: 00 SUB CODE: SS, MM

NO REF SOV: 012 OTHER: 003

Card 2/2

SAMSONOV, G.V.

"Intermetallic compounds and their interaction" by I.I. Kornilov. Reviewed by G.V. Samsonov. Izv. AN SSSR. Neorg. mat. 1 no.12:2227-2228 D '65.

(MIRA 18:12)

SAMSONOV, G.V.; ETINGOV, Ye.D.

Separation of various components of vlatomycin using the gel-filtration method through G-25 sephadex and potentiometric titration. Antibiotiki 10 no.3:217-219 Mr '65.
(MIRA 18:10)

1. Leningradskiy khimiko-farmatsevticheskiy institut.

SAMSONOV, G.V.; ETINGOV, Ye.D.

Determination of the equivalent weight, of ionogenic groups number and molecular weight of the antibiotic ristomycin. Antibiotiki 10 no.5:401-405 My '65. (MIRA 18:6)

1. Leningradskiy khimiko-farmatsevticheskiy institut.

L 57105-65 EWP(e)/EWT(m)/EWP(i)/EPF(n)-2/EWG(m)/EPR/EWP(t)/EWP(b) Ps-4/
Pu-4 IJP(c) JD/JG/AT/WH
ACCESSION NR: AP5015438 UR/0185/65/010/006/0622/0629

AUTHOR: Samsonov, H. V. (Samsonov, G.V.); Paderno, Yu. B.; Fomenko, V.S.

TITLE: Thermal emission characteristics of transition metals and their compounds

SOURCE: Ukrayins'kyy fizychnyy zhurnal, v. 10, no. 6, 1965, 622-629

TOPIC TAGS: work function, thermionic emission, transition emission, transition metal, refractory compound, electron configuration, boride structure, nitride structure, silicide structure, carbide structure

ABSTRACT: The purpose of this article was to bring together some of the data collected to date on the thermal emission properties of various transition metals. The authors discuss the relationship between the electronic structure of transition metals, their alloys and compounds with boron, carbon, silicon and nitrogen, and the characteristics of their thermal emission. The article shows the work function of different transition metals and their carbides, borides, nitrides, and silicides as a function of their atomic number (Figure 1 of the Enclosure). The effects of the electron configurations in alloys of transition metals containing d-electrons, transition metals with other metals containing the outer s- and p-electrons, and transition metals with boron, carbon silicon, and nitrogen are considered with respect to their work function. It is shown that the electronic work

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L 57105-65

ACCESSION NR: AP5015438

function depends significantly on the nature of filling of the p- and d-electron shells of the metal atoms. The magnitude of the electronic work function of refractory compounds is also determined by the degree of filling of the electron states of transition metals and the ionization potential of metalloid atoms. The largest values of the electronic work function are predicted for either half-filled or completely-filled stable electron states. The work function of electrons from the metalloid-containing refractory compounds is lowered as a result of a lesser degree of coupling between the electrons and the atomic nuclei. This property, in conjunction with their high melting points, makes them extremely suitable for the production of efficient thermoemission tube filaments. Orig. art. has: 2 figures and 1 table. [08]

ASSOCIATION: Instytut problem materialoznavstva AN URSR, Kiev (Institute for Material Research Problems, AN URSR)

SUBMITTED: 27Mar64 ENCL: 01 SUB CODE: TD, MM

NO REF SOV: 018 OTHER: 001 ATD PRESS: 4036

Card 2/3

L 57105-65

ACCESSION NR: AP5015438

ENCLOSURE: 01

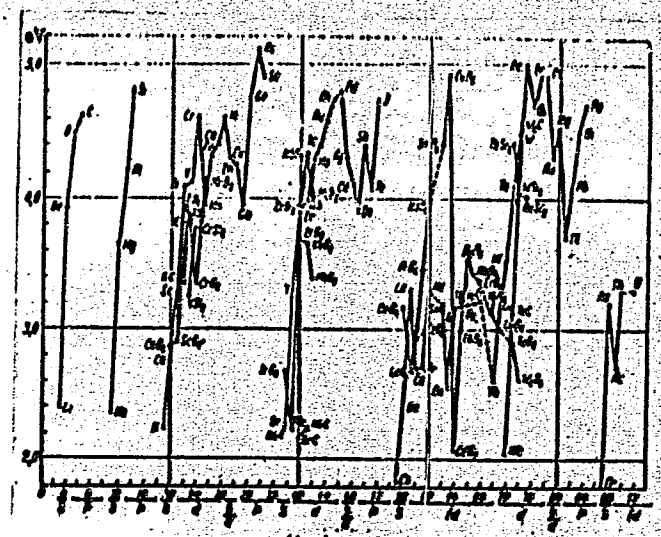

Fig. 1. Work function of elements and compounds as related to their position in the periodic table

x - Element; O - borides; Δ - carbides; o - silicides.

Card 3/3

L 4188-66 EWT(m)/EWP(w)/EWG(m)/T/EWP(t)/EWP(b) IJP(c) RDW/JD

ACCESSION NR: AP5016538 UR/0126/65/019/006/0939/0941

AUTHOR: Samsonov, G. V.; Verkhoglyadova, T. S.; Dvorina, L. A.

TITLE: Hardness of certain rare earth silicides

SOURCE: Fizika metallov i metallovedeniye, v. 19, no. 6, 1965, 939-941

TOPIC TAGS: hardness, lanthanum compound, yttrium compound, scandium compound, cerium compound, praseodymium compound, neodymium compound, silicide

ABSTRACT: The microhardness of silicides of scandium, yttrium, lanthanum, cerium, praseodymium, and neodymium was studied with a PMT-3 instrument. In all the silicide phases studied, a change in microhardness with the load was observed up to a certain value of the load, beyond which the microhardness changed negligibly. This confirmed the dependence of microhardness on load employed which was established earlier. The lowest hardness in each system is displayed by the phases richest in silicon, i. e., phases in which the covalent bond Si-Si is strong and the Me-Si bond weak. The tendency of silicon atoms to form covalent bonds with one another causes such a strong differentiation of groups of metal atoms that bound structural elements of metal and silicon atoms are formed; thereby decreasing

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L 4188-66

ACCESSION NR: AP5016538

3

the hardness of silicides. The marked difference in the nature of Si-Si and Me-Si bonds in higher silicides also accounts for the appearance of semiconducting properties in lanthanum silicide above 500°C and in cerium silicides. The greatest hardness and brittleness is shown by rare earth monosilicides, as a result of the most uniform electron density distribution and a strong influence of the Me-Si bond. In lower silicides (Me_5Si_3) of the Cr_5B_3-type structure, the metal-metal bond predominates, causing their hardness to be greater than that of disilicides. Orig. art. has: 1 figure, 2 tables.

ASSOCIATION: Institut problem materialovedeniya AN UkrSSR (Institute of Problems of Materials Science, AN UkrSSR) 44,55

SUBMITTED: 30Jun64 ENCL: 00 SUB CODE: IC, SS

NO REF SOV: 006 OTHER: 003

BVK

Card 2/2

L 61821-65 EWP(e)/EWT(m)/EPF(c)/EWP(i)/EPF(n)-2/EWG(m)/T/EWP(t)/EWP(k)/
EWP(z)/EWP(b) Pf-4/Pr-4/Ps-4/Pu-4 IJP(c) JD/JG/AT/WH
ACCESSION NR: AP5018459 UR/0131/65/000/007/0030/0035
666.76:661.55

AUTHOR: Samsonov, G.V.; Kazakov, V.K.

TITLE: Boron nitride — silicon nitride and boron nitride - silicon carbide refractories

SOURCE: Ogneupory, no. 7, 1965, 30-35

TOPIC TAGS: boron nitride refractory, silicon nitride refractory, silicon carbide refractory, powder metallurgy, fused borax, molten zinc

ABSTRACT: The specimens were prepared from BN-Si and BN-Si_3N_4 powder-mixtures in which the components were present in amounts such that the final product would contain 20, 40, 60, and 80 mole % BN. The powder mixtures were pressed and sintered for 2-3 hr. at 1550C in nitrogen, hydrogen, and air. The BN-Si samples were first heated at 1350C to nitride the silicon. X-ray structural analysis did not reveal any differences in the BN-Si and BN-Si_3N_4 samples. The BN-Si_3N_4 system contains four phases: BN, β-Si_3N_4, Si_2ON, and a slight amount of α-Si_3N_4. Some mechanical properties of the BN-Si_3N_4 refractories obtained are tabulated; their transverse strength (at a high content of Si_3N_4) is much greater than that of carborundum refractories with a nitride binder. The oxidation resistance of the materials was also studied. Bn-Si_3N_4 refractories were attacked by fused borax only half as fast as

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ACCESSION NR: AP5018459

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Si_3N_4-SiC refractories. Tests of the effect of molten zinc on BN-Si_3N_4, Si_3N_4, Si_3N_4-SiC, TiC, ZrC, and TiN showed that BN-Si_3N_4 is the most resistant material. SiC-BN specimens were prepared by sintering for 1-2.5 hr. at 2200-2400C. Depending upon the sintering temperature, the products either were two-phase alloys with new phases (2300-2350C) or contained the original components (2250C); their physicomechanical properties were determined. Applications of the synthesized refractories are listed. Some of the tests were carried out at the Vsesoyuznyy nauchno-issledovatel'skiy institut elektrotermicheskogo oborudovaniya (All-Union Scientific Research Institute for Electrothermal Equipment) and the Leningradskiy zavod im. D. I. Mendeleyeva (Leningrad Plant). Orig. art. has: 4 figures and 4 tables.

ASSOCIATION: Institut problem materialovedeniya AN UkrSSR (Institute of Materials Science Problems, AN UkrSSR)

SUBMITTED: 00 ENCL: 00 SUB CODE: MT, MM

NO REF SOV: 008 OTHER: 002

Refractory Compounds - 27

Card 2/2

L 53980-65 EWT(m)/EPF(c)/EPF(n)-2/EWP(t)/EWP(t) Pr-4/Pu-4 IJP(c) JD/NW/JG/RM

ACCESSION NR: AP5013779 UR/0073/65/031/005/0433/0439
669:621.762

50
47
B

AUTHOR: Samsonov, G. V.

TITLE: Electron structure and properties of hydrides of transition metals

SOURCE: Ukrainskiy khimicheskiy zhurnal, v. 31, no. 5, 1965, 433-439

TOPIC TAGS: hydride, transition metal, titanium, zirconium, vanadium, hafnium, thorium, palladium, niobium, chromium, tantalum

ABSTRACT: Hydrides of transition metals are the simplest injection phases and are relatively simple "models" for investigating the nature of the chemical bond in compounds of transition metals and non-metals. In the formation of hydrides there is a transition of the 1s electron of hydrogen to the d electron subshells of the transition metals, i.e., the hydrogen atom is metallized and converted to a proton. The approximate characteristics of the acceptor ability of the d electron subshells should be considered in studying the nature of the chemical bond in transition metal hydrides. The nature of the chemical bond between the atoms of the metal and hydrogen is determined by the acceptor ability of the transition metal atom and the

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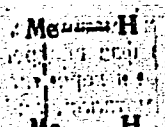
L 53980-65

ACCESSION NR: AP5013779

3

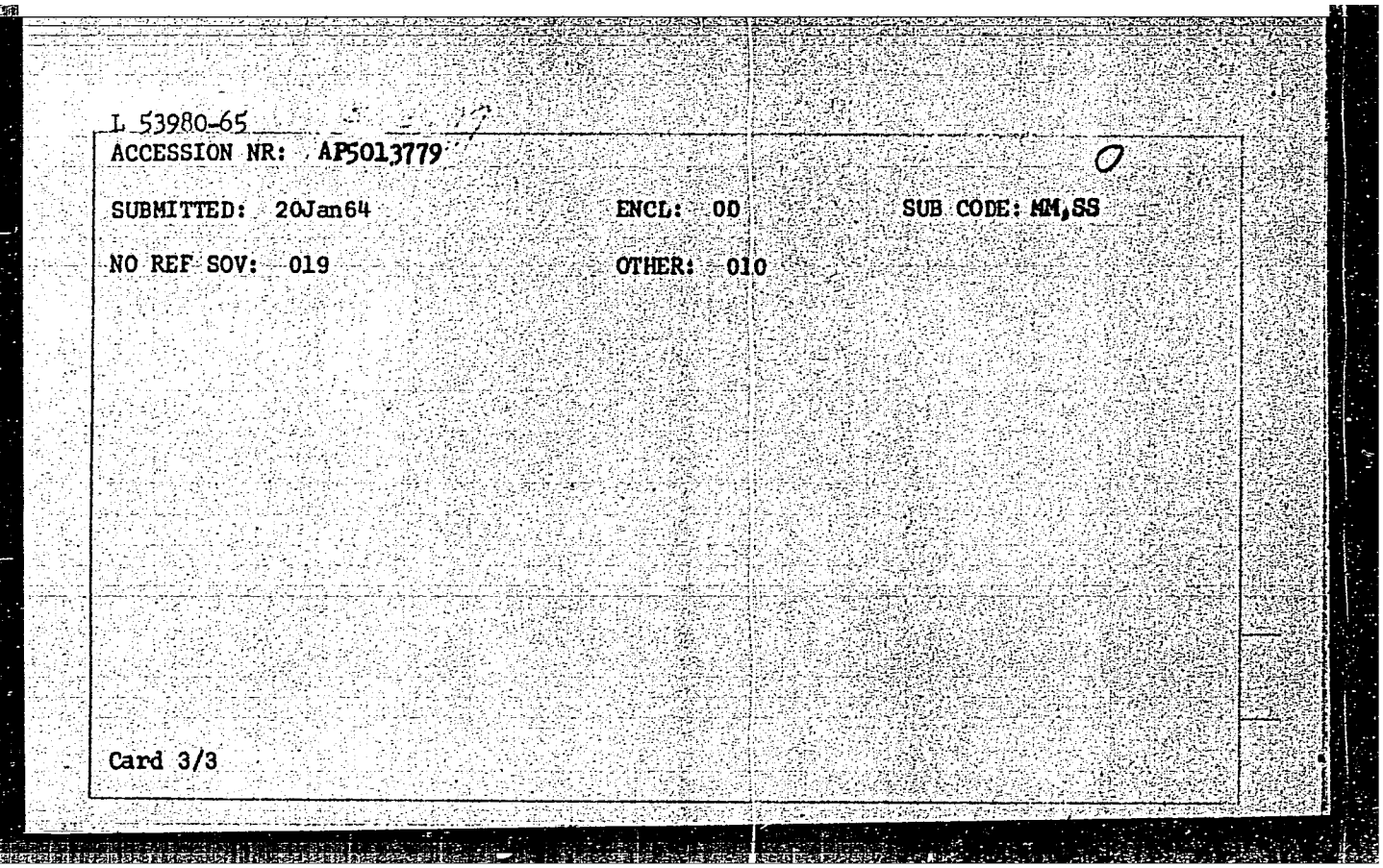
ionization potential of the hydrogen atom. The tendency of the hydrogen atoms to form a covalent bond and the noticeably covalent exchange action between the metal atoms should also be considered. X-ray analysis shows that in solid miobium 1.1-1.3 electrons per atom form an aggregate while the remaining 3.7-3.9 valence electrons form a strong covalent bond. The chemical bonds in the hydrides may be outlined as follows



where the sign -- is the metal bond of the collective electrons and the sign : is the covalent bond of the electron pairs. Physical properties which are studied include heat of formation, proton magnetic resonance, electrical resistance, electrical conductivity, and superconductivity. Orig. art. has: 6 figures.

ASSOCIATION: Institut problem materialovedeniya AN UkrSSR (Institute of Problems in the Science of Materials, AN UkrSSR)

Card 2/3



L 53980-65

ACCESSION NR: AP5013779

SUBMITTED: 20Jan64 ENCL: 00 SUB CODE: MM,SS

NO REF SOV: 019 OTHER: 010

Card 3/3

KALNIN'SH, K.K.; MOSKVICHEV, B.V.; DMITRENKO, L.V.; BELEN'KIY, B.G.; SAMSONOV, G.V.

Infrared spectra of amino acids in a sorbed state. Izv. AN SSSR. Ser.khim. no.10:1897-1899 '65. (MIRA 18:10)

1. Institut vysokomolekulyarnykh soyedineniy AN SSSR.

SAMSONOV, G.V.; KLIKH, S.F.; YEL'KIN, G.E.; KIL'FIN, G.I.

Thermodynamic functions of the sorption of vitamin B_{12} by the salt forms of sulfonated resins. Koll. zhur. 27 no.1:101-105 Ja-F '65. (MIRA 18:3)

1. Leningradskiy khimiko-farmatsevticheskiy institut.

L 4117-66 EWT(m)/T/EWP(t)/EWP(b)/EWA(c) IJP(c) JD/JG

ACC NR: AP5025578 SOURCE CODE: UR/0073/65/031/010/1005/1015

AUTHOR: Samsonov, G. V. 44,55

ORG: Institute for Problems of the Science of Metals, AN UkrSSR (Institut problem materialovedeniya AN UkrSSR) 44,55

TITLE: Classification of carbides 27,44,55

SOURCE: Ukrainskiy khimicheskiy zhurnal, v. 31, no. 10, 1965, 1005-1015

TOPIC TAGS: physical chemistry property, physical chemistry theory, crystal structure, carbide, chemical bonding

ABSTRACT: In an attempt to classify carbides on the basis of electron configuration, crystal structure, and the chemical and physical properties of the carbide phases, a system of classification into the following groups is proposed:

1) Salt-like or ionic carbides formed by non-transition metals with s valence electrons (with completely filled or completely shielded inner shells). The first ionization potentials of these range from 3 to 7 ev (carbides of alkali metals and alkaline earth metals). The carbides of beryllium and magnesium occupy an intermediate position between this group and the groups of ionic-covalent carbides (lanthanides and actinides) and that of covalent carbides (see group 5, below).

Card 1/2 UDC: 669.296'781:621.762

L 4117-66
ACC NR: AP5026578

2) Covalent-metallic carbides formed by metals of the copper and zinc subgroups, whose outer s electrons have first ionization potentials from 7 to 11 ev.

3) Covalent carbides, formed by those elements whose isolated atoms have outer sp electrons. Since carbides of beryllium and magnesium, with characteristics of covalent as well as ionic compounds, can be included in this group, it may be designated as the group of covalent and covalent-ionic carbides.

4) Metal-like carbides of sd transition metals (atomic numbers 22—28, 40 to 46, and 72—78).

5) Salt-like covalent-metallic carbides of sdf transition metals, i.e., of lanthanides and actinides. Carbides of yttrium and scandium occupy an intermediate position between this group and the group of metal-like carbides, since they exhibit characteristics of both groups.

The above classification can be further refined with development of the concepts of electron configuration and bonding in carbides. It should prove useful as an intermediate step in the study of carbides. [ATD Press: 4123-F]

SUB CODE: IC, GC / SUBM DATE: 25Mar64 / ORIG REF: 024 / OTH REF: 003

Card 2/2

SAMSONOV, G.V. [Samsonov, H.V.]

Causes of the formation of tetravalent terbium compounds. Dop. AN URSR no.11:1482-1484 '65.

(MIRA 18:12)

1. Institut problem materialovedeniya AN UkrSSR; chlen-korrespondent AN UkrSSR.

L 7927-66 EWP(e)/EWT(m)/EWP(i)/ETC/EWG(m)/EWP(t)/EWP(b) IJP(c) JD/JG/AT/WH

ACC NR: AP5027937 SOURCE CODE: UR/0363/65/001/010/1803/1810

AUTHOR: Samsonov, G. V.

ORG: Institute of Materials Science Problems, Academy of Sciences, UkrSSR, Kiev (Institut problem materialovedeniya Akademii nauk UkrSSR)

TITLE: Chemical bonding, electronic structure, and certain physical properties of refractory compounds

SOURCE: AN SSSR. Izvestiya. Neorganicheskiye materialy, v. 1, no. 10, 1965, 1803-1810

TOPIC TAGS: chemical bonding, refractory compound, electron structure, transition element

ABSTRACT: Two categories of refractory compounds are discussed: (1) those formed by transition metals with nonmetals (borides, carbides, nitrides, oxides, silicides, phosphides, sulfides, germanides, etc.); in terms of physical properties and chemical bonding they are considered to be metallike compounds. (2) Those formed between nonmetals (boron and silicon carbides, nitrides, phosphides; silicon-boron alloys, etc.) and referred to as nonmetallic. Bond character in the first category is discussed in terms of the following: (1) In the presence of up to 5 electrons inclusive in the d orbital, the

UDC: 669.018.4

Card 1/2

L 7927-66

ACC NR: AP 5027937

transition metal atom is primarily an electron acceptor, and when over 5 electrons are present, an electron donor; (2) possibility of formation by metal atoms of electron configurations which are stable in a quantum-mechanical sense, e.g., $\underline{d}^5\underline{s}^2$, $\underline{d}^0\underline{s}^2$, etc., when the monotonicity of the change in properties with a change in the probability criterion is impaired; (3) possibility of formation of stable electron configurations by atoms of the nonmetal with a stability which increases as one approaches the inert gas configuration (s^2p^6); (4) possibility of formation of stable electron configurations by atoms of metals and nonmetals. Intermetallic compounds, which constitute a third category, are not discussed because they are governed by the same principles as the metallike compounds. Orig. art. has: 3 figures.

SUB CODE: IC, GC / SUBM DATE: 05Jul65 / ORIG REF: 020 / OTH REF: 004

Card 2/2

L 10253-66 EWP(e)/EWT(m)/EWP(t)/EWP(k)/EWP(z)/EWP(b) IJP(c) JD/JG

ACC NR: AP6000001 SOURCE CODE: UR/0080/65/038/011/2393/2397

AUTHOR: Antonova, M. M.; Samsonov, G. V.

ORG: none

TITLE: Preparation of hydrides of transition metals of the fourth and fifth group of the periodic system

SOURCE: Zhurnal prikladnoy khimii, v. 38, no. 11, 1965, 2393-2397

TOPIC TAGS: inorganic synthesis, chemical reaction, hydrogen compound, hydride, transition metal, titanium, zirconium, vanadium, niobium, tantalum

ABSTRACT: Reactions of powdered titanium, zirconium, niobium, vanadium, and tantalum with hydrogen have been studied to optimize the operating conditions (temperature and time) for preparing the richest in hydrogen hydrides of these metals. The study was prompted by expansion of potential technological uses of transition metal hydrides. The vacuum apparatus, starting materials, operating procedure, and analytical method of hydrogen determination in hydrides were described as common to all hydrides studied. The experimental data were tabulated for titanium and zirconium powders and tantalum shavings. Corresponding data for niobium and vanadium were given in the earlier studies of the authors [ZhFKh, 35, 900 (1961) and ZhPKh, 33, 1407 (1960)]. The optimum temperature and time of the reactions were given for preparation of $TiH_{1.93}$, ZrH_2, $VH_{0.915}$, NbH, and $TaH_{0.69}$. These compositions, with the exception of

Card 1/2 UDC: 541.444+546.8+546.85

L 10253-66

ACC NR: AP6000001

NbH, contain the maximum absorbable hydrogen. The maximum absorbable hydrogen content in niobium was 63 at% which corresponds to NbH_2, but this phase was not detected in the product. The formation of hydrides was correlated with electron transfer from hydrogen to unfilled d-electron shells of the transition metal, and the hydrogen absorption was correlated with the acceptor capability of these shells. Orig. art. has: 5 figures and 2 tables.

[JK]

SUB CODE: 07, 11 / SUBM DATE: 28Oct63/ ORIG REF: 007/ OTH REF: 003/
ATD PRESS: 4160

Card 2/2

L 42312-66 EWT(m)/EWP(t)/ETI IJP(c) JD/WW/HW/JG/JH

ACC NR: AP6019830 SOURCE CODE: UR/0370/66/000/001/0107/0112

AUTHOR: Lamikhov, L. K. (Novosibirsk); Samsonov, G. V. (Kiev)

ORG: none

TITLE: Effect of reaction between the components of an aluminum alloy in the liquid state on aluminum grain size

SOURCE: AN SSSR. Izvestiya. Metally, no. 1, 1966, 107-112

TOPIC TAGS: aluminum base alloy, metal grain structure

ABSTRACT: The article reports a study of the effect of the simultaneous addition of two transition metals on the size of cast macrograins in the following aluminum alloys: aluminum-titanium-iron; aluminum-titanium-chromium; aluminum-titanium-zirconium; aluminum-tantalum-tungsten; and aluminum-iron-nickel. The modifiers added were titanium, zirconium, tantalum, tungsten, iron, chromium, and nickel, in amounts not exceeding 0.1%. The aluminum used was Brand AB 000 (99.9% Al). The modifiers were introduced in the form of aluminum alloys. After mixing, the alloys were poured into a form previously heated to 60°C. The samples obtained, which weighed 40 grams, were cut along a vertical plane into two equal parts. A polished sample was prepared from one half. In the

UDC: 669.716:621.74

Card 1/2

L 41350-66 EWT(m)/EWP(t)/ETI IJP(c) JD

ACC NR: AP6020960 SOURCE CODE: UR/0226/66/000/006/0052/0059 49 B

AUTHOR: Bondarev, V. N.; Samsonov, G. V.

ORG: Institute of Physicochemical Principles for Ore Processing, AN SSSR (Institut fiziko-khimicheskikh osnov pererabotki mineral' nogo syr' ya AN SSSR) Institute for Problems in Science of Materials, AN UkrSSR (Institut problem materialovedeniya AN USSR)

TITLE: Metal chemistry of germanides 27

SOURCE: Poroshkovaya metallurgiya, no. 6, 1966, 52-59

TOPIC TAGS: germanide, germanium, ~~classification,~~ crystal ~~configuration~~ structure, electron structure, electron interaction, metal chemical analysis

ABSTRACT: Data on the interaction of germanium with the elements of periodic system are discussed on the basis of the electronic structure of isolated atoms, as well as on the basis of ideas on the formation of stable configurations in crystals.

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L 41350-66

ACC NR: AP6020960

A tentative classification of germanium is presented in the original article. Orig. art. has: 4 figures. [Based on authors' abstract] [AM]

SUB CODE: 11, 20/ SUBM DATE: 17Mar66/ ORIG REF: 014/ OTH REF: 021/

Card 2/2 LLb

L 32071-66 EWT(m)/EWP(t)/ETI IJP(c) JD/WW/JG

ACC NR: AP6014066 SOURCE CODE: UR/0294/66/004/002/0207/0213

54

AUTHOR: Samsonov, G. V.; Panasyuk, A. D. B

ORG: Institute of Problems of Materials Science, Academy of Sciences, UkrSSR (Institut problem materialovedeniya Akademii nauk UkrSSR)

TITLE: Some electrophysical characteristics of niobium and zirconium carbides in the homogeneity region 27 27 27

SOURCE: Teplofizika vysokikh temperatur, v. 4, no. 2, 1966, 207-213

TOPIC TAGS: thermal emf, niobium carbide, compound, zirconium carbide, thermocouple, electric property, thermoelectric property

ABSTRACT: The electrical properties of niobium and zirconium carbides were studied over a wide range of temperatures (up to 2800°C) to determine their behavior and temperature dependence in the homogeneity phase. The preparation of these materials and correction of results to 100% density are described. Conductivity and thermal electromotive force coefficients are determined as a function of the concentration, x, of the bound carbon atoms in the carbide. It is found that ZrC_x has linear thermal emf dependence while that of NbC_x is more complex. Theoretical discussions of the results is given and compared with the measured values. The study of the thermoelectric pro-

UDC: (537.323 + 541.67)001.5

Card 1/2

L 32071-66

ACC NR: AP6014066

perties of these materials led to the development of thermocouples for 3000°C operation, described in [D. F. Panasyuk, G. V. Samsonov, *Teplofiziko vysokikh temperatur*, 1, No. 1, 136, 1963.] Orig. art. has: 9 figures, 1 table, 2 formulas.

SUB CODE: 20/// SUBM DATE: 06Feb65/ ORIG REF: 006/ OTH REF: 005

Card 2/2

L 32619-66 EWT(m)/EWP(t)/ETI IJP(c) JD/JH

ACC NR: AP6012838 SOURCE CODE: UR/0080/66/039/004/0729/0735

36
B

AUTHOR: Samsonov, G. V.; Sinel'nikova, V. S.; Kopylova, V. P.

ORG: Institute of Materials Science Problems, AN UkrSSR (Institut problem materialovedeniya AN UkrSSR)

TITLE: Aluminothermic reduction of titanium oxides

SOURCE: Zhurnal prikladnoy khimii, v. 39, no. 4, 1966, 729-735

TOPIC TAGS: chemical reduction, ~~aluminum~~, titanium oxide, ~~titanium dioxide~~, aluminum oxide, ~~aluminum compound~~ titanium compound

ABSTRACT: The conditions of reduction of titanium oxides (TiO_2 and TiO) by aluminum in a vacuum were studied in order to obtain titanium aluminides. The mechanism of the aluminothermic reduction was investigated by recording the corresponding thermograms for TiO_2 and TiO. In order to determine the phase composition of the products, the reduction was carried out at various temperatures, including 975C (the only temperature at which a peak appeared on the thermograms), and the products were analyzed by x-ray diffraction and chemical means. The following conclusions were reached: the reduction of TiO_2 by aluminum in a vacuum proceeds via the formation of TiO and Al_2O_3; the formation of aluminum titanate

UDC: 546.824'136

Card 1/2

was not observed. At 975C, the aluminides TiAl and $TiAl_3$ are formed during the reduction of both TiO_2 and TiO. Up to 1300C, in addition to the aluminides, aluminum oxide is present in the products; it is reduced by the aluminides and driven off as Al_2O. The rate of heating to the reduction temperature has virtually no effect on the reduction processes. It is sufficient to carry out the heating for 80 to 100 min at about 975C. Aluminum oxide begins to be removed at 1300C, but this is a slow process. The reduction takes place at a rapid rate at 1400—1500C. Alloys of practically any composition can be obtained by changing the amount of excess aluminum in the initial batch. The chemical stability of TiAl and $TiAl_3$ in HCl, HNO_3, H_2SO_4, and H_3PO_4 was determined. Orig. art. has: 6 figures and 3 tables.

SUB CODE: 07,11/SUBM DATE: 25May64 / ORIG REF: 010 / OTH REF: 002

ACC NR AM5001717 Monograph UR/

Samsonov, Grigoriy Valentinovich; Epik, Aleksey Pavlovich

Coatings from refractory compounds (Pokrytiya iz tugoplavikh soyedineniy) Moscow, Izd-vo "Metallurgiya", 1964. 107 p. illus., biblio. Errata slip inserted. 3060 copies printed.

TOPIC TAGS: coating, metal coating, refractory compound, refractory compound coating

PURPOSE and COVERAGE: This book is intended for engineering personnel of machine-building, metallurgical, chemical and other branches of industry. It may also be useful to designers and planners. It summarizes Soviet and non-Soviet information on coating metals, alloys and graphite with refractory compounds, protecting these materials against high-temperature oxidation, and increasing their hardness, refractory properties, and resistance to erosion and corrosion. Methods and procedures of obtaining protective coatings, such as simple and complex boride, carbide, nitride, and silicide phases, on refractory metals are reviewed. Examples of using coatings made of refractory compounds in various engineering fields are given, and the properties of these coatings are discussed.

Card 1/2 UDC621.793:669.018.4

ACC NR: AM5001717

TABLE OF CONTENTS:

SUB CODE: 13/ SUBM DATE: 26Oct63/ ORIG REF: 083/ OTH REF: 050/

Card 2/2

ACC NR: AR6035424 SOURCE CODE: UR/0137/66/000/009/I007/I007

AUTHOR: Samsonov, G. V.; Lamikhov, L. K.

TITLE: Theoretical problems of modification of aluminum and its alloys

SOURCE: Ref. zh. Metallurgiya, Abs. 9I44

REF SOURCE: Vestn. Kiyevsk. politekhn. in-ta. Ser. Mekhan.-tekhnol., no. 2, 1965, 3-15

TOPIC TAGS: aluminum, aluminum alloy, alloy composition, metal grain, grain size, electron donor, metal crystallization

ABSTRACT: The authors investigated the modifying influence of transition metals on aluminum of brand AV000 (99.9%) and the alloy AL7 (4.5% Cu, 0.8% Fe, base Al). The greatest reduction in the grain takes place when Sc is introduced (1090 and 900 grains per cm^2 of polished section are observed respectively for AV000 and AL7). This is followed in decreasing order of modifying ability by Ti, Zr, Hf, Ta, V, W, Nb, Mo, Re, Fe, Mn, Cr, Co, and Ni. The latter element gives for AV000 and the alloy AL7 respectively 16 and 16 grains per cm^2. The greatest decrease in grain takes place in the case of elements that can play the role of acceptors for the electrons given up by the Al atoms. The modifying influence of the transition metals on Al and alloys on its basis is attributed to the fact that the atoms of these elements, by interacting with the Al atoms, contribute to the formation in the melt of more stable atomic groupings which, at a definite degree of supercooling, reach the critical size of the equilibrium crystallization nucleus. In other words, the atoms of the transition metals contribute

Card 1/2 UDC: 669.715.017: 620.186.8

ACC NR: AR6035424

to a decrease in the work of formation of the crystallization nucleus and the occurrence of a large number of crystals per unit volume. The authors studied also the joint influence on the reduction in the grain of aluminum of a pair of additives, such as Ti and Zr, Ti and Fe, Ti and Cr, Ta and W, and Fe and Ni. In the case of Ti and Zr, the strongest suppression of the modifying action of each element was observed. A noticeable decrease in the modifying action of Ti is observed also in the presence of Fe and Cr. When Ta and W or Fe and Ni are introduced simultaneously, they act practically independently of each other. The weakening action of Zr, Fe, and Cr on the grain-reducing ability of Ti is attributed to the electronic interaction in the melt between the Ti atoms, on the one hand, and the Zr, Fe, and Cr on the other, as a result of which the acceptor ability of the Ti atom is reduced. L. Rokhlin [Translation of abstract]

SUB CODE: 11, 20

Card 2/2

ACC NR: AP6034763 SOURCE CODE: UR/0407/66/000/001/0028/0032

AUTHOR: Samsonov, G. V. (Kiev); Mukha, I. M. (Kiev); Krushinskiy, A. N. (Kiev)

ORG: none

TITLE: Choice of electrode materials for electric spark treatment

SOURCE: Elektronnaya obrabotka materialov, no. 1, 1966, 28-32

TOPIC TAGS: electrode, erosion, electric discharge

ABSTRACT: The experiments described in the article were carried out on a Type A207-12 electric spark unit, under identical conditions for all the electrodes treated; the electrodes had identical working areas. Copper and brass were used as standards for comparison. To determine the relative electro-erosion resistance of materials with different percentages of tungsten carbide, cobalt, copper, and nickel, the coefficient of relative resistance, K, was calculated by the formula:

$$K = P_2/P_1$$

where P_1 is the weight difference of the electrode before and after the test; P_2 is the weight difference of the treated material before and after the experiment. The chemical composition of the treated electrodes is shown in a table. It is concluded on the basis of the experimental data that, in the choice of materials for fabrication of electrodes, it is necessary to take into consideration the increase in the erosion

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ACC NR: AP6034763

resistance with an increase in the statistical weight of the stabilized configurations, the increase in the energetic resistance of these configurations, and the maximum reduction in the statistical weight of the non-localized electrons. Orig. art. has: 1 figure and 2 tables.

SUB CODE: 11, 20/ SUBM DATE: none/ ORIG REF: 012

Card 2/2

ACC NR: AP6036790 (N) SOURCE CODE: UR/0363/66/002/011/1991/1997

AUTHOR: Bazhenova, L. N.; Ivan'ko, A. A.; Samsonov, G. V.; Slyshankova, V. A.

ORG: Kiev Polytechnic Institute (Kiyevskiy politekhnicheskiy institut)

TITLE: Microhardness of some oxides

SOURCE: AN SSSR. Izvestiya. Neorganicheskiye materialy, v. 2, no. 11, 1966, 1991-1997

TOPIC TAGS: oxide microhardness, aluminum oxide, beryllium oxide, magnesium oxide, calcium oxide, titanium oxide, zirconium dioxide, hafnium dioxide, niobium pentoxide, chromic oxide, HARDNESS, STRESS CONCENTRATION

ABSTRACT: The microhardness of a series of oxides has been tested with various indenter loads (30—200 g) applied for various lengths of time. It was found that the microhardness of oxides decreases with increased load and increased test duration. The average microhardness (kg/mm^2) was as follows: Al_2O_3—2540; MgO—1015; CaO—615; TiO_2—1085; ZrO_2—1230; HfO_2—925; Nb_2O_5—740; Cr_2O_3—2970. It is believed that the hardness of the oxides depends on the probability of metal and oxygen atoms forming stable electron configurations. As the number of stable configurations formed by one or both of the components drops, the number of free electrons increases and the hardness also drops. Orig. art. has: 3 figures and 2 tables.

SUB CODE: 11/ SUBM DATE: 21Jul65/ ORIG REF: 007/ OTH REF: 001/
Card 1/1 UDC: 541.45:539.53

L 10344-67 EWT(m)/EWP(e) WH

ACC NR: AP6031598 (N) SOURCE CODE: UR/0226/66/000/008/0101/0105

AUTHOR: Samsonov, G. V.; Vitryanyuk, V. K.; Ordenko, V. B.

ORG: Kiev Polytechnical Institute (Kievskiy politekhnicheskiy institut)

TITLE: Preparation of highly porous materials from refractory compounds

SOURCE: Poroshkovaya metallurgiya, no. 8, 1966, 101-105

TOPIC TAGS: porous material, refractory metal, refractory metal compound, refractory metal carbide, refractory metal boride, refractory metal silicide, oxide reduction, POROSITY, POROUS METAL

ABSTRACT: The authors investigated the possibility of obtaining high-porosity products from carbides, silicides and borides of refractory metals by reduction of oxides with simultaneous sintering of the obtained active particles of compounds, during which the volatile products of reduction, such as CO, B_2O_2 and SiO, escape. Conditions were established for the preparation of high-porosity articles (up to 70—72% porosity) from chromium carbide by reduction of chromium oxide with carbon black and simultaneous sintering. Orig. art. has: 2 figures and 2 tables. [TD]

SUB CODE: 11, 13/ SUBM DATE: 06Apr66/ ORIG REF: 011/ OTH REF: 001

Card 1/1 pb

ACC NR: AP6023002 SOURCE CODE: UR/0185/66/011/004/0437/0438

AUTHOR: Samsonov, G. V.; Shlyuko, V. Ya.

ORG: Institute of Problems in the Science of Materials AN UkrSSR, Kiev (Instytut problem materialoznavstva AN UkrSSR)

TITLE: Thermionic emission properties of rare earth borides

SOURCE: Ukrayins'kyy fizichnyy zhurnal, v. 11, no. 4, 1966, 437-438

TOPIC TAGS: rare earth metal, boride, scandium compound, yttrium compound, lanthanide series, work function, electron transition, electron emission, electron shell

ABSTRACT: Rare earth borides of Sc, Y and most lanthanides have good thermionic emission properties and low work functions which makes it possible to use them as cathode materials. The work function of rare earth hexaborides is assumed to be determined by donor-acceptor interaction between the atoms of the metal and boron on the basis of the number of possible rare earth element terms and the possibility of $f \rightarrow b$ electron transitions. The authors feel that a more accurate interpretation of the rare earth hexaboride work function may be made on the basis of the theory of electron configuration stability where the electrons are produced in the d-f shells of the transition metal atoms. The production of the three most stable electron configurations (f^0, f^7 and f^{14}) in the f-states of the electron shell is studied. In studying the first group of

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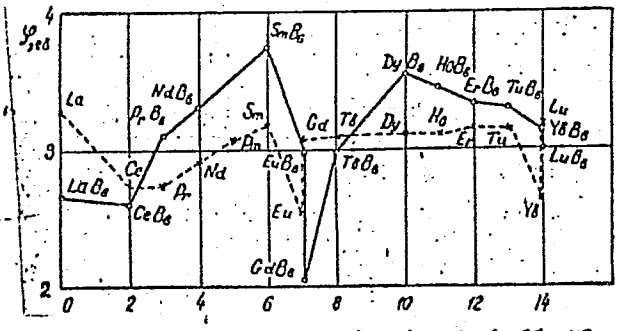
ACC NR: AP6023002

lanthanides where atoms in an isolated state have 7 or less electrons in the f-shell, it may be assumed that the statistic weight of the f^7-states increases with the number of electrons in the f-shell. Since s-electrons take part in emission with partial transition to the f-level, increasing the statistic weight of the f^7-configurations, the work function of the metals grows uniformly with an increase in the number of electrons in the f-shell up to six. Thus the work function increases with the statistic weight of the stable f^7-configurations in the metal crystal. A graph is given showing the work function of the rare earth elements and their hexaborides as a function of the number of electrons in the f-shell (see figure). Orig. art. has: 1 figure.



Number of electrons in the f-shell of an isolated metal atom

Relationship between the work function of rare earth elements and their borides, and the number of electrons in the f-shell

SUB CODE: 20/ SUBM DATE: 10Aug65/ ORIG REF: 005/ OTH REF: 001

Card 2/2

ACC NR: AP7004406 SOURCE CODE: UR/0226/67/000/001/0099/0104

AUTHOR: Samsonov, G. V.; Paderno, Yu. B.; Murguzov, M. I.; Fedorchenko, V. P.

ORG: Institute for Problems in the Science of Materials, AN UkrSSR (Institut problem materialovedeniya AN UkrSSR)

TITLE: Gallochalcogenides of rare earth metals

SOURCE: Poroshkovaya metallurgiya, no. 1, 1967, 99-104

TOPIC TAGS: rare earth metal, gallochalcogenide, chalcogenide, crystal lattice, electric resistance, thermal electromotive force, impurity level, semiconductor, electron structure, ionization potential, chemical bonding

ABSTRACT: The authors conclude that atoms of rare-earth metals are arranged in a crystal lattice. The electrical resistance and thermal electromotive force were measured at room temperature to 1100 K. It is shown that neodymium galloselinide is a semiconductor with a forbidden-zone width and impurity level ionization energy of 1.78 and 0.77 ev, respectively. The nature of the semi-

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ACC NR: AP7004406

conductivity of $NdGaSe_3$ is explained on the basis of the electron structure of isolated atoms and their ionization potential. An hypothesis is advanced as to the nature of the chemical bonding in chalcogenides of rare-earth metals. Orig. art. has: 1 figure and 3 tables. [Authors' abstract] [NT]

SUB CODE: 11/SUBM DATE: 10Aug66/ORIG REF: 011/OTH REF: 004/

Card 2/2

ACC NR: AP7006203 SOURCE CODE: UR/0363/67/003/001/0061/0066

AUTHOR: Alekseyevskiy, N. Ye.; Samsonov, G. V.; Shulishova, O. I.

ORG: Institute of Materials Science Problems, Academy of Sciences, UkrSSR, Kiev (Institut problem materialovedeniya Akademii nauk UkrSSR)

TITLE: Superconductivity of solid solutions of transition metal carbides and nitrides

SOURCE: AN SSSR. Izvestiya. Neorganicheskiye materialy, v. 3, no. 1, 1967, 61-66

TOPIC TAGS: superconductivity, carbide, nitride, transition metal compound

ABSTRACT: The temperatures of transition to the superconducting state were studied in systems of solid solutions TiC-NbC, ZrC-NbC, HfC-NbC, ZrC-TaC, HfC-TaC, HfC-MoC, TaC-MoC, NbC-NbN and TaC-NbC, constituting a class of compounds with a face-centered cubic NaCl-type lattice. The transition temperatures were determined from the change in the mutual induction of the measuring coils on an alternating current bridge. All the values of the critical temperature were extrapolated to a zero magnetic field. For all systems except TaC-NbC, a nonlinear change of the critical temperature with the composition was established. The observed regularities in the change of the critical temperature in these solid solution systems are analyzed, and it is postulated that change of T_c with the composition results from a change in the density of the electron states. Orig. art. has: 1 figure, 2 tables and 1 formula.

SUB CODE: 07,20/ SUBM DATE: 15Jan66/ ORIG REF: 004/ OTH REF: 013

Card 1/1 UDC: 537.312.62

ACC NR: AP7007799 (A) SOURCE CODE: UR/0080/67/040/001/0003/0006

AUTHOR: Serebryakova, T. I.; Samsonov, G. V.

ORG: none

TITLE: Conditions of formation of chromium borides

SOURCE: Zhurnal prikladnoy khimii, v. 40, no. 1, 1967, 3-6

TOPIC TAGS: chromium carbide, boride, chromium oxide, chromium compound

ABSTRACT: In a study of the borothermic method of synthesizing boride phases of chromium, the charges were prepared for the following reactions:

$$Cr_2O_3 + B \rightarrow Cr_4B + B_2O_2, \quad (1)$$
$$Cr_2O_3 + B \rightarrow Cr_3B_2 + B_2O_3, \quad (2)$$
$$Cr_2O_3 + B \rightarrow CrB + B_2O_2, \quad (3)$$
$$Cr_2O_3 + B \rightarrow Cr_3B_4 + B_2O_2, \quad (4)$$
$$Cr_2O_3 + B \rightarrow CrB_2 + B_2O_2, \quad (5)$$
$$Cr_2O_3 + B \rightarrow CrB_6 + B_2O_2. \quad (6)$$

The reduction products were analyzed chemically and by x-ray analysis. By studying the products of reaction (3), it was found that the formation of CrB begins at 1200° and is complete at 1500°. Above this temperature, the product consists of a mixture of CrB and CrB_2. A study of the conditions of synthesis of CrB in a graphite tube

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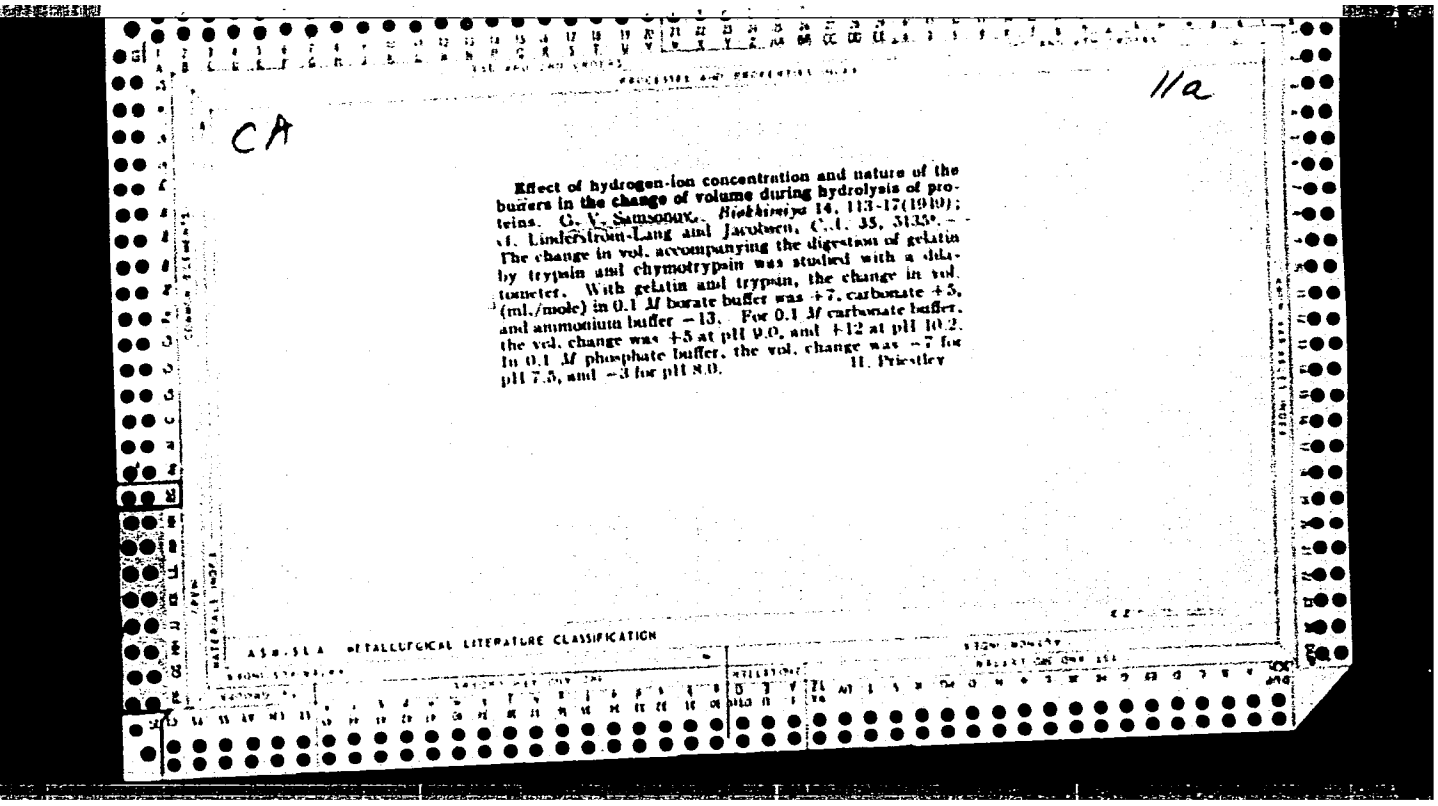
ACC NR: AP7007799

furnace in a hydrogen medium by the boron carbide method, which involves the reaction $Cr_2O_3 + B_4C \rightarrow CrB + CO$ (at 1000-2100°), showed that up to 1900° a mixture of CrB (main phase) and CrB_2 is formed; at 1900° and above, the samples melted. The conditions of synthesis and compositions of the charges for the five synthesized phases (Cr_4B, Cr_3B_2, CrB, Cr_3B_4 and CrB_2) are described. Orig. art. has: 3 figures and 2 tables.

SUB CODE: 07/ SUBM DATE: 08Feb65/ ORIG REF: 004/ OTH REF: 002

Card 2/2



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Effect of hydrogen-ion concentration and nature of the buffers in the change of volume during hydrolysis of proteins. G. V. Samsonov. *Biokhimiya* 14, 113-17(1949); cf. Linderstrøm-Lang and Jacobsen, C.A. 35, 3135⁹. The change in vol. accompanying the digestion of gelatin by trypsin and chymotrypsin was studied with a dilatometer. With gelatin and trypsin, the change in vol. (ml./mole) in 0.1 *M* borate buffer was +7, carbonate +5, and ammonium buffer −13. For 0.1 *M* carbonate buffer, the vol. change was +5 at pH 9.0, and +12 at pH 10.2. In 0.1 *M* phosphate buffer, the vol. change was −7 for pH 7.5, and −3 for pH 8.0. H. Priestley

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